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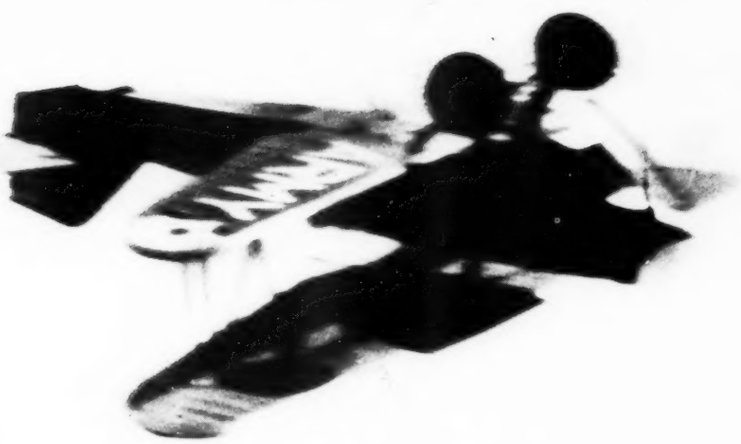

Lieut. J. H. Doolittle flying Curtiss Hawk upside down. Note shadow of wheel on the wing.

VOLUME XXIII

NUMBER 20

Special Features

Five Years of Progress

Fuel for the Wright Whirlwind

How and Why an Airplane is Static Tested

AVIATION PUBLISHING CORPORATION
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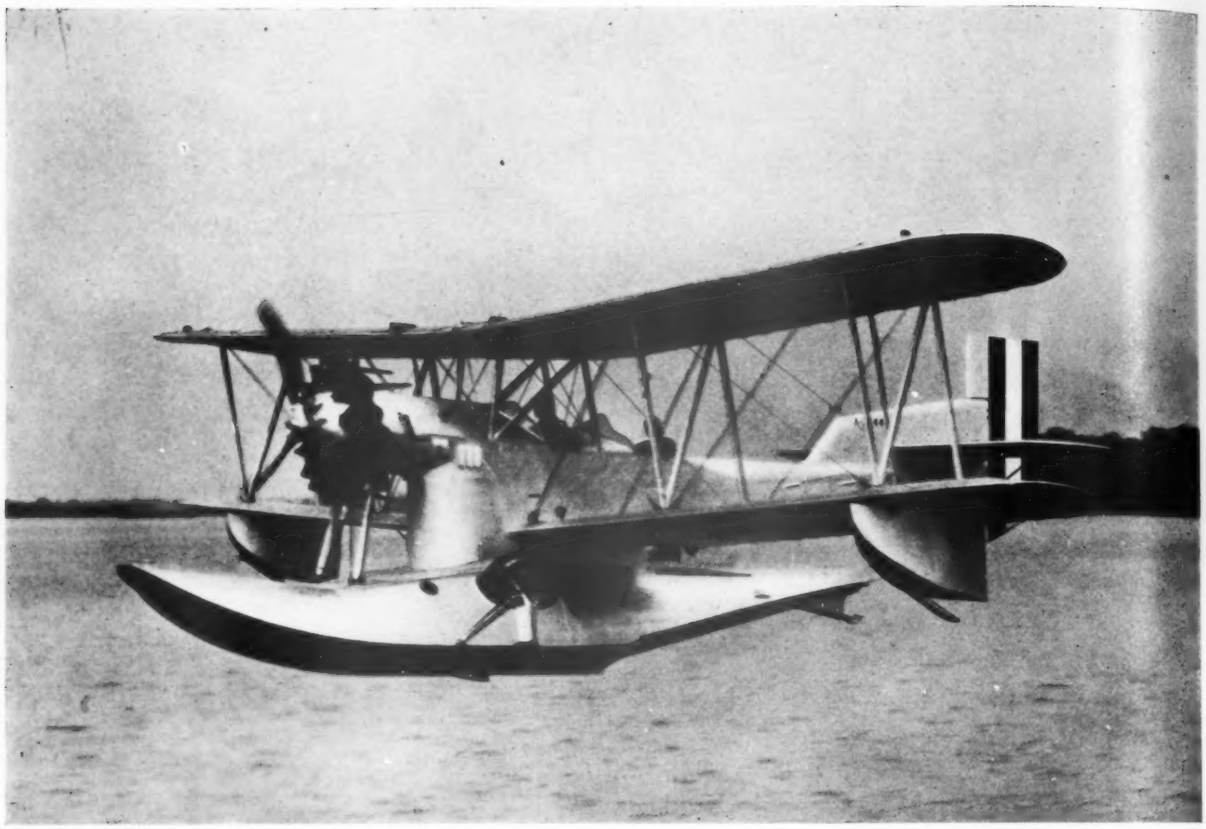

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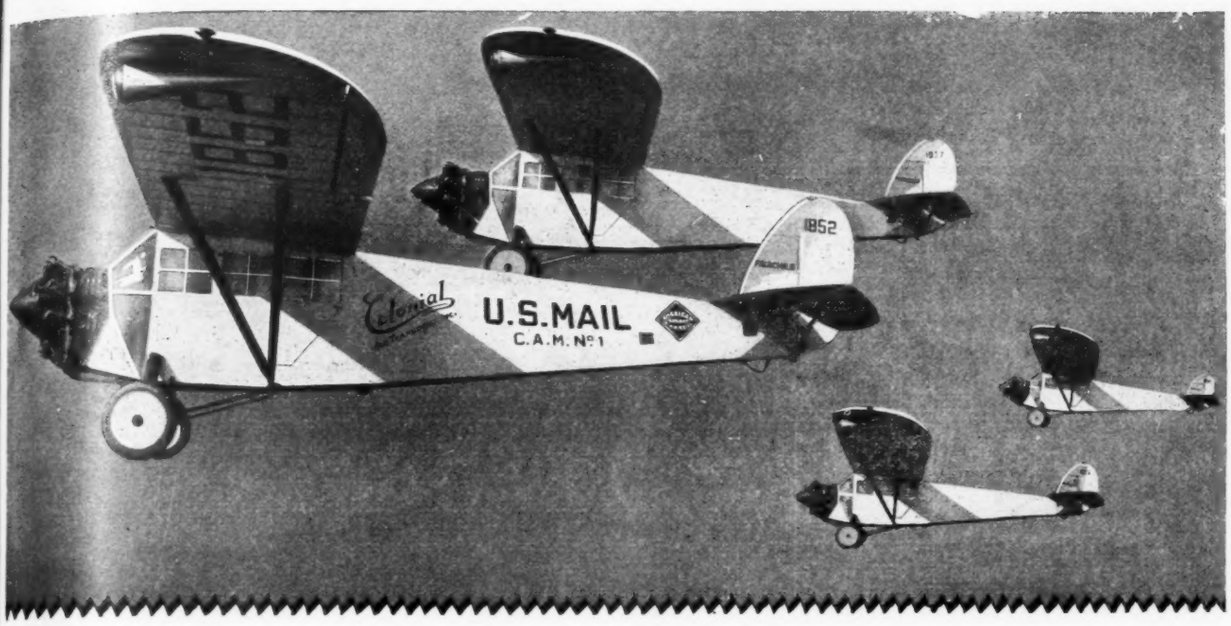

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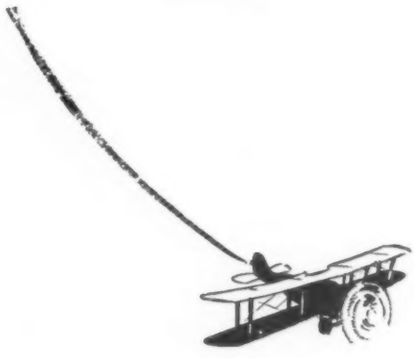

AFTER the exigencies of war, the airplane became an important factor in speedy mail transportation.

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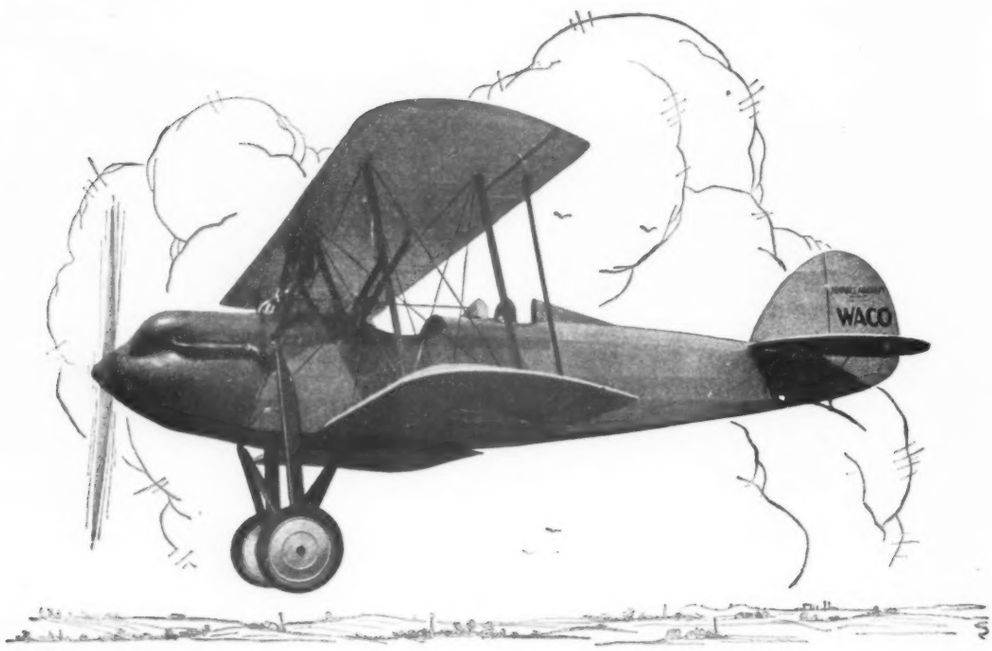

WACO Made the Most Exceptional Record of any Ship in the Field At Spokane Races

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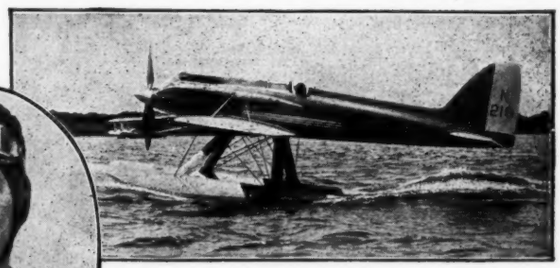
Lieut. S. M. Kinkead

Lieut. O. E. Worsley, who came in second.


Lieut. S. N. Webster and his supermarine Napier S-5 Monoplane, won the Schneider Cup at 281.488 miles per hour for Great Britain. He depended on Meyrowitz Luxor Goggles. Note that he is entirely exposed to the wind.

Lieut. S. N. WEBSTER, winner of the Schneider Trophy on Sept. 26th, 1927 wore a stock pair of Meyrowitz Luxor Goggles — U. S. Air Service Model 6. Faster than man ever flew before — breaking all records — these goggles met every requirement of this gruelling test.

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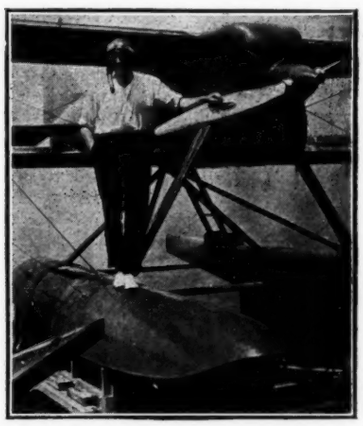
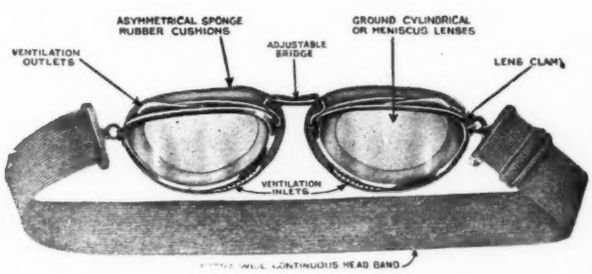

Lieut. Alford Williams and his 24 cylinder X shaped motor speed plane in which he expects to do 300 miles per hour. He uses Meyrowitz Luxor Goggles.



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Vol. XXIII *November* 14, 1927 No. 20

Index to Contents

EDITORIALS 1159
FIVE YEARS OF PROGRESS 1160
WHY AND HOW AN AIRPLANE IS STATIC TESTED 1164
THE NATIONAL AERO DEVELOPMENT ORGANIZED IN DETROIT 1166
THE FOCKE-WULF "ENTE" 1167
ADVERTISES AIR MAIL EXPRESS 1169
PLAN SECOND AIR MEET 1169
FUEL FOR WRIGHT WHIRLWIND 1170
CANADIAN SHIP TO SHORE PLANE EXPERIMENTS PROVE SUCCESSFUL 1172
A TRAINING PLANE HEIGHT RECORD 1172
FUEL SUPPLY STATIONS MARKED 1172
THE RYAN BROUGHAM MONOPLANE 1173
AIRCRAFT EXPORT FIGURES FOR THE FIRST SIX MONTHS OF 1927 1175
RULES AND REGULATIONS OF THE LONDON AEROPLANE CLUB 1194
PRODUCTION OF FOKKER UNIVERSALS FOR COMMERCIAL USE INCREASING 1195
TO OPEN AIR MAIL BID DEC. 28 1195
LARGE TRANSPORT PLANE UNDER CONSTRUCTION AT BOEING PLANT 1196
PLAN INTERNATIONAL AIR SHOW 1197
CURTISS RECEIVES PLANE ORDER 1197
BELLANCA MOVES FACTORY 1197
KEYSTONE GETS BOMBER ORDER 1197
FOKKER PLANE HAS THIRD WHEEL 1197
FOREIGN AERONAUTICAL NEWS 1198
SIDE SLIPS 1199
AIRPORTS AND AIRWAYS 1200
U. S. AIR FORCES 1209
INDEX TO ADVERTISERS 1210

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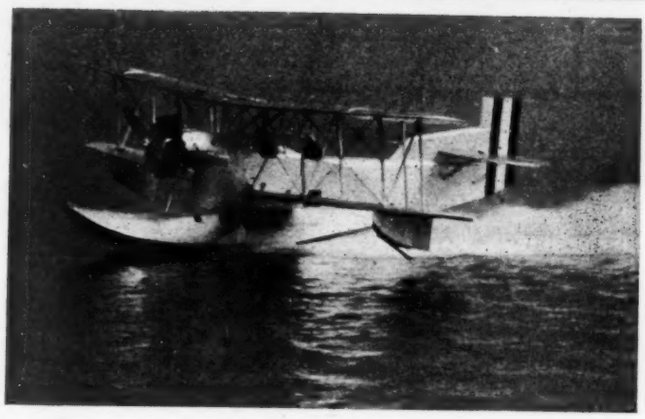

The Loening OL-8 Amphibian

Powered With Pratt & Whitney "Wasp" 425 hp. Engine

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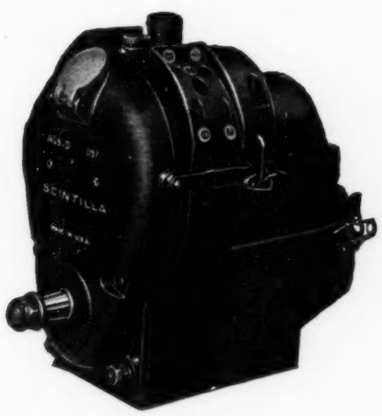

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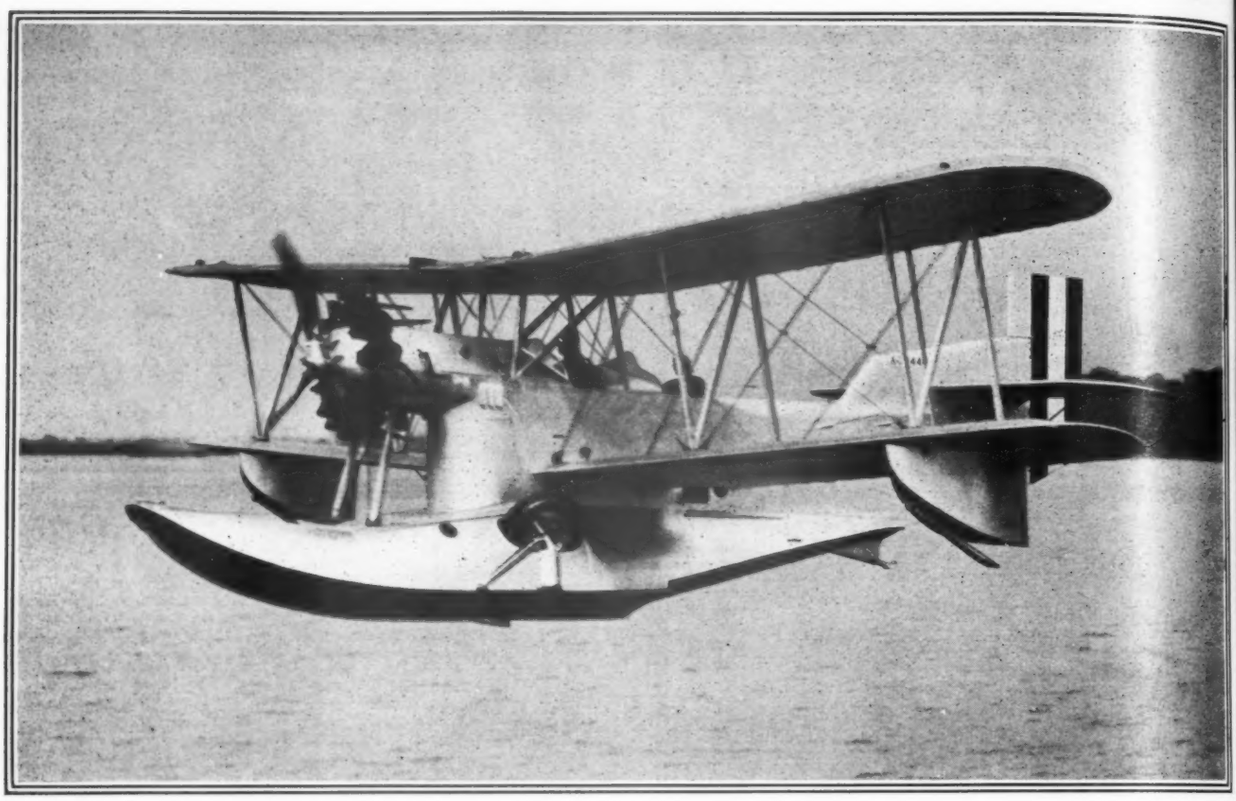

The Latest Loening Amphibian uses "Wasp" Engines

This new plane is the latest addition to the ever growing list of Wasp installations. In the Amphibian it has shown a considerable increase in performance over its water-cooled predecessor.

Superior characteristics have made the "Wasp" one of the most versatile engines. Its application now includes Single and Two-place Fighters, Amphibians, Bombers, and Commercial Transport Planes.

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Vol. XXIII *NOVEMBER* 14, 1927 No. 20

Adequate Housing

AT THE present time a condition exists which is tending to prevent respectable men from staying in our air corps, and which is seriously impairing the morale of the whole force. Reference is made to the housing conditions at many of the air stations.

During the war an emergency existed and it was necessary to put up a large number of buildings in a very short time. As the buildings were only supposed to last for a year or so they were hastily thrown together out of the cheapest material. Yet after ten years they are still housing the major part of the personnel of our air corps. One can usually tell a good deal about a man from the surroundings in which he lives, and, in the reverse way, the surroundings will have an effect on the man. An officer who is forced to live with his wife and family in a shanty through which the wind sifts and which is not water tight will either consider leaving the service or he will be as sloppy as his surroundings and too, the right type of enlisted men will not be attracted to stay by the air service unless they are comfortably housed.

The housing question applies to the whole army but perhaps more especially to the air corps for most of our air fields were developed during the war and the building was of an emergency nature. There are so many pressing needs for immediate expenditures that it is often hard to take a far sighted and statesmanlike view of appropriations, but the need for proper housing for our air corps is out of such importance that it should not be delayed any longer. Those interested in aeronautics should unite in an effort to remedy a situation which is a shame to the United States and which seriously injures the efficiency of the air corps.

The Guggenheim Competition

IT IS rather a curious fact that five out of the seven firms now entered in the Guggenheim Safe Airplane competition are European and that so far there have only been two American entrants. This however does not necessarily indicate that America lacks inventive genious nor that American designers are uninterested in the competition but it can be traced rather to the peculiar conditions which now exist in the aircraft industry in this country.

At the present time every factor is extremely busy and most of them have orders well ahead on their books. The expansion of this year and preparations for next year's business have required large amounts of working capital. It is therefore only natural that capital and brain power should have gone into filling the immediate need and that temporarily at least the American aircraft industry should be more interested in meeting the demand for a product which is saleable and hence apparently satisfactory than in doing experimental work which is extremely costly and where no market has as yet been developed.

The Guggenheim competition is certainly a move in the right direction and the winner will be well rewarded financially, and there is little doubt that there will also be a great demand for this type of plane. It is to be hoped that during the next year there will be several more responsible American entrants in the competition.

Airport to City Transportation

ONE OF the main features of aerial transportation, and one that air transport companies have ballyhooed since their inception, has been the item of speed. At every turn they have advocated the airplane as the great time saver in traveling between cities. Yet, strange as it may appear, there have been instances where the time from hotel to hotel via airplane was so little less than the time from hotel to hotel via the railroad that the saving was not worth the additional expenditure in transportation fees.

However, such a condition was not due to the airplane or the air route traveled. On the contrary, the delay was due entirely to poor and inadequate means of transportation from the airport to the city proper.

There are, in this country, many airports that are located adjacent to street car or motor bus lines. Others, not so fortunately located, have been taken care of by the inauguration of bus lines by either the airport owners or the transport companies operating to and from that point. However, there are a few airports, miles removed from the heart of the city, with no means of ground transportation and the air traveler must depend upon the kind heartedness of some passing motorist.

Such, of course is a detriment to air travel as regards inducing laymen to patronize air lines. And it would seem altogether fitting for the officials of such airports to install some means of adequate transportation to the passenger's ultimate destination and thus boost business, rather than let the matter continue to slide and injure the chances of the future patronage of the air traveler who was forced to cool his heels on the field for an hour or so before he was fortunate enough to obtain a lift to town in a private car.

Five Years *of* Progress

An Interview with B. F. Mahoney

By ANDREW R. BOONE

B. F. Mahoney, president of the B. F. Mahoney Aircraft Corp., San Diego, Calif. Above: A Ryan Brougham in flight.

THE B. F. Mahoney Aircraft Corp. of San Diego, Calif., is still going full speed ahead! Last month we celebrated our fifth year of existence, having carried since our first plane took the air 21,381 passengers over a distance of 632,000 mi.—equivalent to 25 times around the world—without a single fatal accident to pilot, student or passenger.

As the world knows our organization built Col. Charles A. Lindbergh's New York-Paris monoplane. From the beginning through the period of building Colonel Lindbergh's plane to the present, we have grown from an organization of one pilot and one mechanic carrying passengers in a single "Jennie" off a baseball field, to an organization now employing more than 150 men, with a weekly payroll aggregating a little more than 2,500. Add to this the building of the only experimental plane in history which has completed a 36,000-mile tour exactly one minute ahead of schedule, without a delay in the tour due to faulty plane or engine, and you will note a record of which naturally we feel proud. That plane has dashed once across the Atlantic and been flown three times across the American continent, a fine record for any man-made means of locomotion.

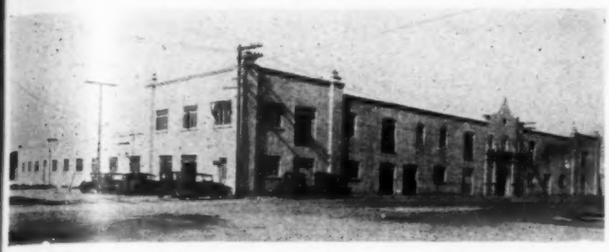
The corporation was established originally as the Ryan Flying Co. It then was a co-partnership between B. F. Mahoney and T. C. Ryan. Later these two men organized the Los Angeles-San Diego Airline, the first passenger-carrying airline in America operating on a daily schedule and one of the first in the world to operate at a profit. Later the name was changed to Ryan Airlines and in the fall of 1926 Ryan disposed of his interest to his partner. It then became the B. F. Mahoney Aircraft Corp.

Our first plane was known as the Ryan M-1, an open job which early was adopted for some air mail work. This led to development of the M-2, a slightly larger plane. These two types were used as a basis for calculations for the redesigning of a plane suitable for a flight from New York to Paris. We cast our fate in the moulding of that famous plane. Our hopes either flew successfully with it, or fell with it into the North Atlantic. For two months our entire staff gave Colonel Lindbergh all their attention and worked with him unceasingly.

Our engineering department was required to re-design the

M-2 to the extent that it would carry 450 gal. of gasoline and 20 gal. of oil and make a cruising speed of at least 100 m.p.h. and a cruising range of 4,000 mi. The engineers' estimate on it was a cruising speed of 105 m.p.h., and a cruising range of 4,200 mi. The actual performance in the flight from San Diego to St. Louis saw the cruising speed about 109 m.p.h., and on the flight from St. Louis to New York it was better than 110 m.p.h. Including the climb to better than 10,000 ft. to avoid sleet storms in crossing the Atlantic, the average speed was 107½ m.p.h. So the plane in all cases not only exceeded the requirements which Colonel Lindbergh demanded, but it exceeded the engineers' estimates, which were in excess of Colonel Lindbergh's requirements.

As Colonel Lindbergh said on arriving at Paris, "As a matter of fact, I had what I regarded and still regard as



The B. F. Mahoney Aircraft Corp. factory at San Diego, Calif.

the best existing plane to make the flight from New York to Paris."

In preliminary tests on this plane at Camp Kearney, near San Diego, stick and unstick tests with loads varying from 20 gal. to 300 gal. of gasoline, the plane again practically exceeded all the engineers' estimates. It performed the unusual feat at that time of taking off with 1½ times its own weight in 1028 ft., and the more unusual feat of landing without any damage whatever to the landing gear with more than 1½ times its weight in useful load.

Such is the quality and stability of our present monoplane!

The "Spirit of St. Louis" being serviced by students of the Mahoney School of Aviation.

Men buy airplanes only after investigation. They think of aircraft both in terms of dollars and life. They want safe craft, and for the purposes our planes are designed to fill, they want planes at a fairly reasonable cost. Satisfied that the Mahoney monoplane meets both requirements, our customers have ordered far in advance of production; and they include the U. S. Department of Commerce and many large American corporations. Foreign shipments have been made to Australia, New Zealand, Canada, Japan, Mexico, Hawaii, Central and South America. From Point Barrow, Alaska, to Mexico, Mahoney planes are in daily operation, carrying passengers, express, mail and private owners. Also representatives from Greece, Brazil, China, Great Britain and Scandinavia are negotiating for planes.

Our plans now call for two developments—the international marketing of a single type plane, the Brougham; and the conduct of a school for pilots. The latter will be held at San Diego, where our plant is located. The method here will be of interest for, in a sense, we apply the "intelligence test" to piloting. We will issue two types of diplomas, the type depending upon the time a student requires in com-

The factory banquet given in honor of Col. Charles A. Lindbergh upon his return to the starting point of his famous San Diego-New York-Paris Flight

pleting his instruction. Each student also will be required to pass a test on national and international air regulations. So there will be a premium on a pilot's adaptability. Those who learn more rapidly will be graduated earlier and awarded a diploma so stating. But more of this later.

Our standard plane will be the Brougham, and, with Wright Whirlwind engine, will be standard production plane for some months to come. The engineers plan constantly to improve the model. The research laboratory is also experimenting on a low-powered monoplane to be introduced some time during 1928 or 1929, depending upon the success of present experiments. Donald Hall, our chief experimental engineer, believes it will prove feasible to get extreme efficiency from low-powered planes, and exceeding in economy and cost the present low powered automobiles. Within a few years, he predicts, airplane users will get from 30 to 40 mi. to a gallon of fuel with a light one- and two-passenger plane, with an engine developing between 20 and 40 hp. He sees also the possibility of great speed in these little planes. In his opinion 200 m.p.h. will not be impossible for such a plane, though with present streamlining stock planes of low power do not reach that speed.

Donald Hall, chief experimental engineer of the B. F. Mahoney Aircraft Corp.

Our engineering force includes W. A. Mankey, formerly chief draughtsman for the Douglas Company of Santa Monica, Calif.; Donald Hall, designer of the "Spirit of St. Louis" and formerly with Curtiss and later with the Douglas Company; W. F. Shult, O. B. Clark, G. F. Hammond and C. F. Beed, not including a number of draftsmen concentrating on current production.

A. J. Edwards, our sales manager, secretary-treasurer and member of the board of directors, came to the organization with a background of considerable automobile experience. At one time he held every automobile road race record out of Portland, Ore. Later he had charge of Studebaker sales at Portland and still later at Wichita, Kan. He came to San Diego from Muskogee, Okla. His efforts as sales manager are reflected in the present situation—production sold many weeks ahead.

From early 1914 to 1917 W. H. Bowlus was an experimental airplane engineer. He designed and flew several types of gliders and overhauled and repaired the engines of several power-driven airplanes. During the war he was attached to the 43rd Squadron, U. S. Air Service, and returned to the United States as flight test inspector of McCook Field. In 1924 he was appointed test pilot and plane construction foreman of the original Ryan company. At the present time he is factory manager and member of the board of directors.

Donald Hall, chief experimental engineer, began his training at the Manual Training High School, Brooklyn, N. Y. His practical engineering experience began when he was employed by the Curtiss Aeroplane and Motor Co., Inc., from 1919 to 1921 as airplane draftsman and checker. He went later to McCook Field for experimental work, for a time was with the Douglas Company and came to Ryan Airlines in 1925 as engineer. His most notable work was designing the "Spirit of St. Louis".

W. A. Mankey, engineer in charge of current production.

W. A. Mankey, engineer, came to our organization after a notable career as designer. While employed by the Bureau of Aeronautics, he designed and developed the first navy design seaplane. While there he was instrumental in designing and developing the N-C flying boat, the first seaplane to fly across the Atlantic. Later he designed for the Douglas company the Army World Cruiser, first plane to fly around the world; the Douglas observation plane, adopted by the Army Air Service; the Douglas Army transport and numerous commercial designs.

Through the able assistance of these men and others we are now producing two Broughams weekly and we expect by Spring to have increased our production schedule to four a week. This we hope to do through the cooperation of the engineering department and the factory proper. The engineering department, by the way, is perhaps our most important unit. It is strictly up to date and is probably the largest of any strictly commercial company.

A. J. Edwards, sales manager of the B. F. Mahoney Aircraft Corp.

As for our other future plans, they call for a blanketing of the United States. We will organize 40 dealer organizations in 48 states. These locations have been tentatively selected, the selections being based on general knowledge of trade conditions and the areas centralized around airports. Manifestly aviation in those parts of the country which boast good airports will go ahead more rapidly than elsewhere. What city without a railroad station progresses? The analogy is perfect.

We hope our improvements always will keep our product strictly up to date. The plan calls for our engineers to keep

abreast or ahead of every improvement. Mr. Hall, a fine theorist, is the chief experimental engineer. His duties permit him ample time and opportunity to study all aircraft advance, that any and all improvements may be incorporated in the monoplane. In that way our dealers may be assured of the product being always up to date.

Our marketing plan? Simple. The plane must be built to sell under $10,000, Whirlwind equipped. There is no profit on the plane until we get into production. Yet we felt an obligation to supply a single engine plane at a price which would move it, and we were willing to await production before taking profit. The plan is fundamental and sound. Other manufacturers before us have learned it.

Then there is the foreign market. There are two big "foreign" markets right at our doors, without going half-way around the world for them. In Canada and in Latin-America many opportunities will develop for distribution of single engine monoplanes. Our foreign inquiries are very interesting and already a good many sales have resulted. Particularly in South America will dependable aircraft find a market. I think of one mine high in the mountains of a South American country. Near the mine is a good landing field. But the trail from the railhead to mine is 800 mi. long. At least two weeks are consumed in travel by land. An airplane can cover the distance in five hours, transporting bullion or supplies Think of the saving in expensive means of communication and transportation between mine and civilization. From Mexico City to Tampico another similar route which demands a two-day by mule may be traversed in three hours by airplane. Can the answer be more obvious?

W. H. Bowlus, factory manager of the B. F. Mahoney Aircraft Corp.

I cannot overemphasize the importance of our large engineering department. It is the safeguard to our customers that they will receive planes which embody the latest developments and refinements. For those who do not know, the Brougham is a Wright Whirlwind equipped cabin plane. Already discriminating owners have given it a fine reception. It is a worthy companion to the "Spirit of St. Louis". Many refinements of construction characteristic of the plane built for Colonel Lindbergh are embodied in the Brougham.

One Day Service to Cuba

ACCORDING TO a report by the Aeronautics Branch of the Department of Commerce through air mail and passenger service from New York City to Havana, Cuba will be possible in one day with the extension north to Miami, Fla. of the present air route from Havana to Key West.

This service is made possible by the new air mail contract route between Atlanta and Miami on which proposals have been issued recently. Survey for navigation aids of the new Miami airway is in the 1929 program of the Department beginning July 1, 1928.

The Miami route is 622 mi. each way. It will connect directly with the new New York-Atlanta route to be put in operation soon by Pitcairn Aviation, Inc. The two routes combined will allow mail leaving Hadley Field at New York at 9 P.M. to arrive at Miami at 12:40 the following day, about 15 hr., one whole day faster than the present mail service. The 90 mi. from Miami to Key West could be flown in about an hour, leaving only the 180 mi. route already established from Key West to Havana to be traversed.

Spokane Races Financial Success

FOR THE first time in their history, the national air races paid their way in 1927, according to figures filed with the National Air Derby Association of Spokane by public accountants who have audited the books.

Total receipts, including funds raised from ticket sales, concessions and miscellaneous sources, amounted to $114,063 while expenditures totaled $113,106. In all $47,251 was paid out in prize money and $19,411 for trophies and other expense directly incidental to contests.

With only a few bills of a few dollars each outstanding, the association showed net profits of $956 and the $60,000 in notes, posted by Spokane business men, was all paid back. The notes, which had been carried by the banks, were returned to the makers, without discount.

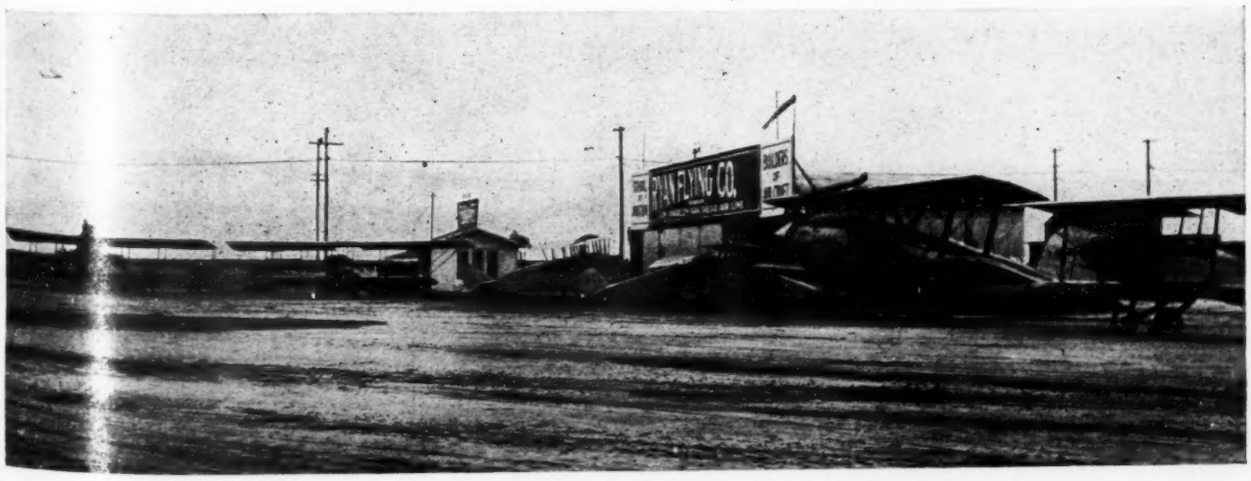


Photo of the original Ryan Flying Co. hangar at San Diego Field.

Why *and* How *an* Airplane *is* Static Tested

W. E. Savage

By W. E. SAVAGE

Chief of Structure Unit, U.S.A.A.C.
Materiel Division, Wright Field, O.

AFTER THE engineer has completed his stress analysis of a proposed airplane, which guides him in choosing the sizes for the structural members that go to make up the airplane structure, his first thought is to subject the complete airplane structure to a weight carrying or static test. All static testing is done on the ground before the newly designed airplane is put through any violent maneuver during flight so that any error made, wrong method employed, or bad

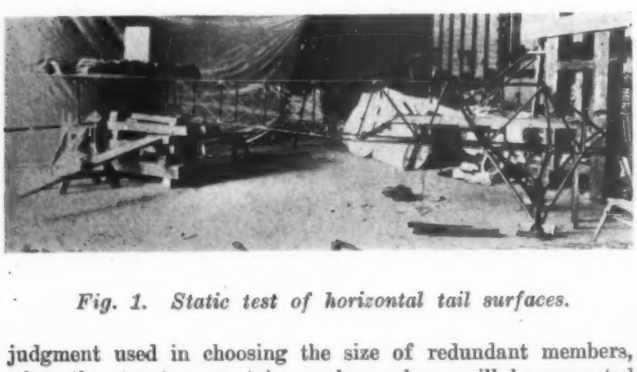


Fig. 1. Static test of horizontal tail surfaces.

judgment used in choosing the size of redundant members, when the structure contains such members, will be corrected and not cause any serious results to the airplane and pilot.

When referring to the structural strength of airplanes the term "Factor of Safety" is not used since the "Factor of Safety" varies with the attitude of flight or maneuver the airplane may be in or is capable of making, or with a variable load which may be carried in the fuselage or body.

The term "Load Factor" is used for specifying the structural strength of the airplane while the control surfaces, which are the vertical tail surface, horizontal tail surface, and ailerons, have their strength properties specified in pounds per square foot.

The required structural strength of an airplane will depend upon the purpose for which the airplane is designed. The slow moving or load carrying airplane is required to support a lower load than the faster moving or pursuit type airplane. This may be explained by the simple experiment of swinging a bucket of water around in a circle and noting the increase in the pull as the speed is increased, and having the water stay in the bucket at the top of the circle explains the reason why the pilot does not hang on his belt at the top of a loop, but of course if the airplane loses its speed while in this position the force that prevents the water in the bucket from spilling, which is called centrifugal force, will become less than that of gravity and the pilot will hang on his belt. Another and better reason for requiring a pursuit or a fast moving airplane to support a higher load is that when these types of airplanes are pulled out of a dive quickly or their direction of flight changed quickly the loads on the airplane have been measured and found to be nearly eight times the load which the airplane would have in normal or level flight. These high loads must be considered in both the stress analysis and in the static test of the airplane.

In the static test of an airplane there are usually ten distinct tests made while there may be as many proof tests which

Fig. 2. Stic test of the vertical tail surfaces

are really static tests not carried to destruction or the loading carried high enough to cause any member of the structure to be stressed beyond its elastic limit.

The ten tests are, and they may be made in the order named: horizontal tail surfaces and controls, vertical tail surfaces and

rudder control, aileron and aileron control, inverted flight load on the wings, low incidence wing test, high incidence wing test, fuselage test, landing gear test, tail skid test, and a test of the leading edge of the wing ribs.

The load used for testing may be either shot or sand contained in bags, or lead in 50 and 100 lb. bars. The sand may be loose but having it in bags of different weights makes it convenient to handle and put in the proper position which is just as important as the weight. The lead shot bags are used in the fuselage test where material of a higher specific gravity is needed due to the small space while the lead bars weighing 50 and 100 lb. are used to load the engine mount.

In testing the horizontal tail surfaces, which should be mounted on the fuselage, the load is so placed on the surfaces

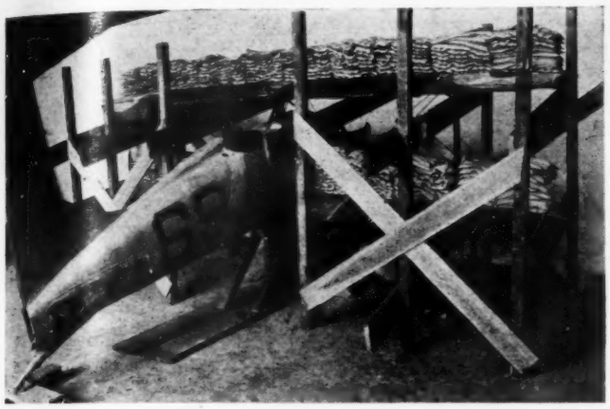


Fig. 3. Inverted load on the wings.

as to stimulate the condition of flight and the magnitude of the load depends upon the type of airplane being tested. However, in all types of airplanes the load imposed on the horizontal tail surfaces is put on in increments of five pounds per square foot with a decrease in magnitude of the increment as the design or breaking load is reached. After each increment is added the pounds pull required on the control stick, necessary to move the load imposed on the elevators, is measured by a spring balance connected to the control stick at that place on the stick where the pilot would grasp it. A photograph of the load on the horizontal tail surfaces and the spring balance connected to the control stick is shown in Fig. 1.

The vertical tail surfaces may be tested in a similar manner, but instead of measuring the pull on the elevator control the push on the rudder bar is measured. A photograph of the loaded vertical tail surfaces is shown in Fig. 2.

In testing the ailerons, which give lateral control, the load

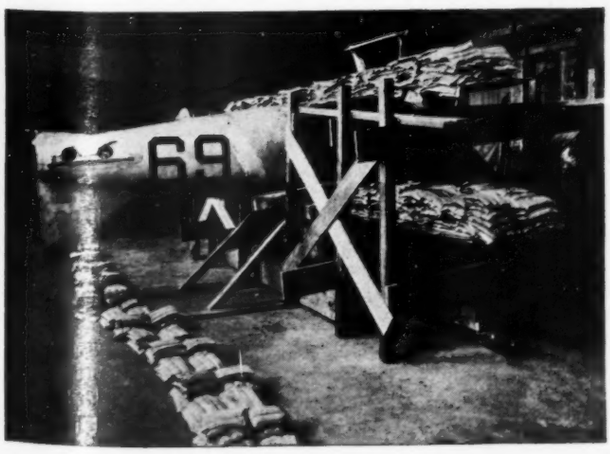


Fig. 4. Low incidence load on the wings.

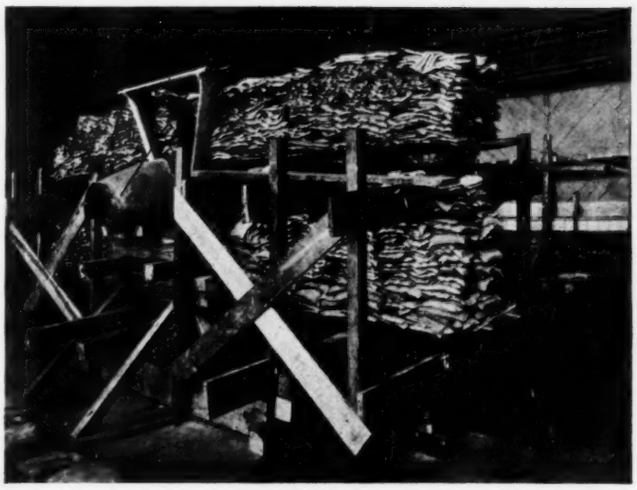


Fig. 5. High incidence load on the wings.

is applied to the surfaces in a manner similar to that in which it is applied to the elevators while the side pull on the control stick is measured instead of the pull fore and aft as in the test of the horizontal tail surfaces.

In testing the wings of an airplane they should always be assembled to the fuselage unless the same type of fuselage has been previously tested. By following this method that portion of the fuselage effected by the wing loading will be thoroughly tested. The members in the fuselage that are tested will be the tension members carrying the load from one side of the wing to the other and the struts in the fuselage that carry the compression loads.

The inverted flight wing load shown in Fig. 3, will be imposed on the wing when the airplane is at the top of a slow loop or when it is flying upside down. The center of gravity of the static load will vary depending upon the airfoil used,

Fig. 6. Static test of the fuselage.

or the shape of the cross section of the wing, but a fair average value of the position of the center of gravity of the load is 30 per cent. of the wing chord measured from the leading edge of the wing. The wing chord just referred to is the distance from the leading edge to the trailing edge of the wing.

In the low incidence wing test, shown in Fig. 4, the complete airplane is turned upside down, supported rigidly by a heavy frame under the fuselage with the wing set at an angle so that the load when applied will produce a force parallel to the lower surface of the wing and one perpendicular to it. These forces commonly called drag and lift forces will vary depending upon the type of airplane and since these forces vary, the angles at which the airplane is set for test will vary but an average value is about 8 deg. In the low incidence test, which represents a combination of high speed and diving con-

dition, the trailing edge will be lower than the leading edge of the wing and the center of gravity of the load will be placed between 45 and 60 per cent. of the wing chord measured from the leading edge of the wing depending upon the airfoil used and the type of airplane tested. The load is applied to the wings in increments which are decreased in magnitude as the designed load is reached.

The high incidence wing test shown in Fig. 5, which corresponds to pulling out of a dive quickly, is conducted in a

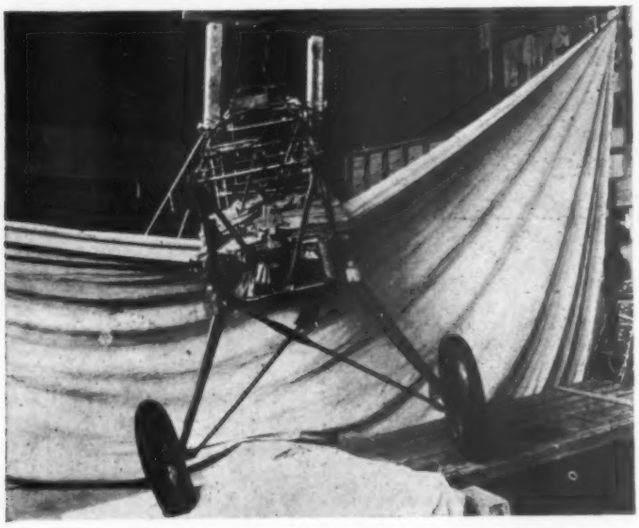


Fig. 7. Dynamic test of the landing gear.

manner similar to the way in which the low incidence test is conducted only the airplane must be reset with the leading edge of the wing lower than the trailing edge. The angle at which the wing is set will vary but will be close to eight degrees. Since the wing is set with the leading edge lower than the trailing edge there will be anti-drag and lift forces instead of drag and lift forces as produced by the load in the low incidence wing test. The center of gravity of the load will move forward to about 30 per cent. of the chord measured from the leading edge of the wing. Of course, the position

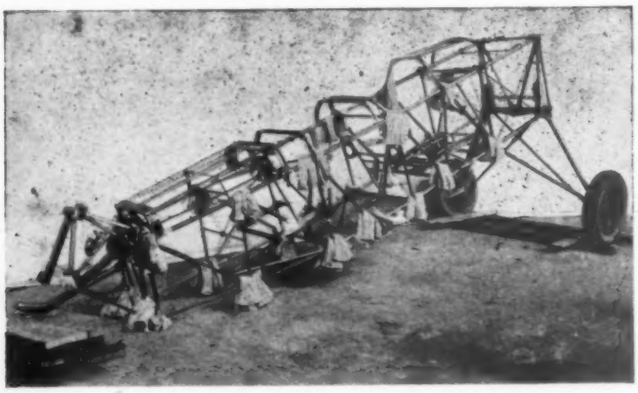


Fig. 8. Dynamic test of tail skid.

of the center of gravity of the load which corresponds to the center of pressure of the wing in flight will vary depending upon the characteristics of the airfoil used. The high incidence wing test is carried to failure while the inverted flight and low incidence tests are carried only to their required or design load.

After the high incidence wing test the airplane is ready to be turned right side up to test the fuselage as shown in Fig. 6. This may be accomplished by applying a load for each item carried in the fuselage multiplied by the required load factor together with a load on the horizontal tail which simulates the air load. The load is put on in increments being applied at that place in the fuselage where the item that the load represents is located.

The landing gear is dynamically or impact tested as shown in Fig. 7, by having the gear attached to the fuselage which is loaded until the load on the wheels is equivalent to that when the airplane is fully loaded. The fuselage with its load, and landing gear is raised different heights and released allowing the wheels of the gear to strike simultaneously on the sloping platform which produces not only a down load but a slide load or side thrust. This loading condition occurs in the landing gear when the airplane makes a cross wind landing. The tail skid, shown in Fig. 8, is tested in a manner similar to the way in which the landing gear is tested. The method of dynamically testing both the landing gear and tail skid was developed and first used by the writer at McCook Field, Dayton, O.

The test on the leading edge of the wing, or that portion extending forward from the front spar, is conducted by applying a load on a six foot section cut from one of the wing panels used in the wing test.

This test not only indicates the strength of the ribs when fastened to the spar but it indicates the combined strength of the false rib when supported laterally by a metal or plywood cover running from the nose to the front spar. The metal or plywood cover also keeps the fabric wing covering from sagging between the ribs during flight. During the static test of any part of the airplane the deflection of the structure is measured and studied, the results of which may be used in the design of future airplanes.

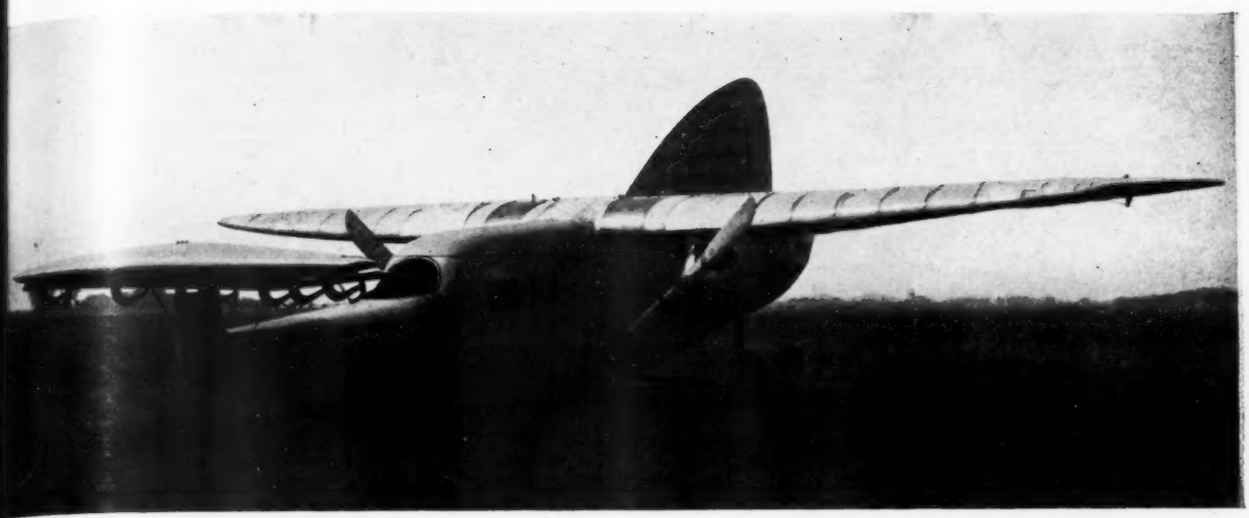
The National Aero Development Club is Organized in Detroit

A CLUB called the "National Aero Development Club", with the main office at 609 Sun Building, 213 State St., Detroit, Mich., has been organized as a non-profit organization, with the purpose to promote aviation. All the officers of the club, and a good many of the charter members, served with the aviation branch of the Army during the war, and have kept up their training ever since.

It is stated that the main purpose of the club is to train young men who are actually interested in commercial aviation in order that flying schools, flying fields, and companies who are interested in commercial aviation may be able to obtain men who have had a good record and recommendation behind them. The club will be supported by annual dues, initiation fees, voluntary contributions, donations, tuition fees, and course fees. The club will offer its members a thorough course in aeronautics, consisting of 24 hr. of flying time, and also a complete course in aerodynamics, navigation, and photography. A complete record will be kept of each member, and members having a good record will be kept in good flying condition by the club until they have obtained a position.

All flying instructions will be given in the latest type airplane built for that purpose. Ground training will be given from good material obtained as a donation from the Army and Navy. It is claimed that members of the club will be able to get actual flying time at a cost twenty per cent less than they could by flying their own plane.

R. J. Thomas, vice-president of the club, and an ex-Army pilot, will have charge of flying instructions. Sherman Yerks has been employed as chief instructor. Mr. Yerks has had eight years experience in commercial aviation, and has spent a number of years with different organizations as flying instructor and test pilot.



Front quarter view of the Focke-Wulf "Ente".

The Focke-Wulf "Ente"

German Design Powered With Two 75 Hp. Siemens Engines Flies 87 M.P.H. on First Test Flight

A VERY interesting type of monoplane was recently test flighted at Bremen, Germany. The plane might be called a radical departure in the aerodynamic design of airplanes as they are known today, though it reverts to some of the principals found on the first airplanes to fly, and which have since been discarded. This plane known as the "Ente" was constructed by the Focke-Wulf Co. of Bremen, Germany, builders of many successful German commercial planes now in use. The structure is quite conventional though the disposition of the surfaces is odd. The horizontal stabilizer and elevator are placed in front of the main wing while an exceptionally large rudder of high aspect ratio is directly behind the wing.

First Type Designed by Voisin

The principals on which the Ente was designed are in no way different from those of the normal modern plane. The first machine of this type, called a "Cunard", was constructed as an experiment by the French concern, Voisin in 1910 and 1911. The principal of this horizontal control surface in front of the main wing was on most of the very early types, including that of the Wright brothers, Bleriot, etc. This early type was called the canard because of the resemblance of the projecting surface to that of the head and neck of a duck when in flight.

On the first flight of the Focke-Wulf Ente, Herr Wulf of that concern was the pilot. After taxiing for about 700 ft. to test out the controls he took off. He kept it low, gathering speed and then gently climbed it to about 600 ft., gradually at first and then more steeply. At that height he attempted a few turns and returned over his starting point holding his hands above his head to demonstrate that the machine would fly itself. He then flew over the city of Bremen, circled around for about ten minutes and returned to the field. According to the builder, an easy glide and perfect landing was made and owing to a defect in the wheel brakes there was an exceptionally long landing run. The only available figure on its performance is a high speed of 87 m.p.h. (140 km. per hr.)

Before proceeding on actual construction of the Ente extensive tests were made in the wind tunnel at Gottingen University and the plane designed and tested to be stable about all three axes. As far as the flight tests were made they seemed to substantiate these wind tunnel tests.

The Ente has a conventional fuselage, though the disposi-

Rear quarter view of the "Ente".

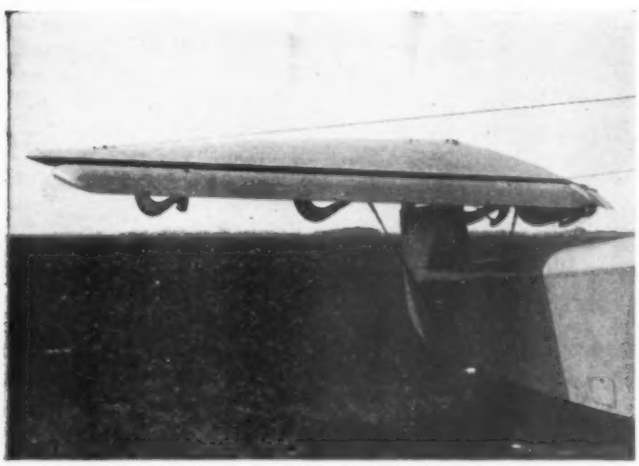
tion of the surfaces somewhat alter its shape. It is like the plywood covered fuselage used by the Focke-Wulf Co. on its standard planes. The monoplane wing, placed near the rear of the fuselage is almost identical to that on the Focke-Wulf A-16, a conventional monoplane. It has conventional type ailerons. The main difference in the wing is that at certain points the angle of incidence is changed. The wing is of wood with box spars. In front of the main wing is the horizontal stabilizer which is adjustable so that it can be turned about its longitudinal axis. This stabilizer tapers in both plan and chord with an elevator mounted at the rear by a number of large external elbows. The elevator is mounted in such a manner that there is a large slot between the elevator and the stabilizer, giving a sort of aileron slot action. At the rear of the fuselage is an exceptionally large vertical fin with rudder attached. This large fin was necessary because of the unconventional disposition of load and peculiar side forces set up.

Two 75 Hp. Siemens Engines

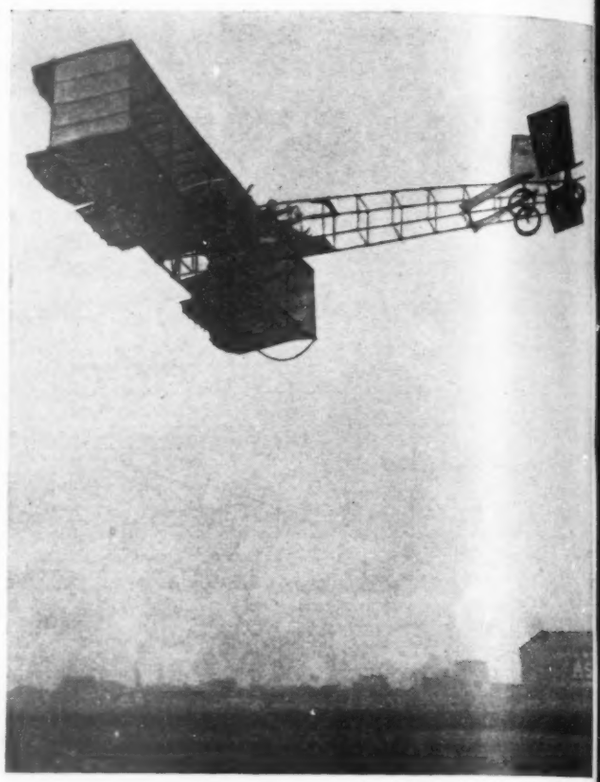
The power plant consists of two Siemens 75 hp., air-cooled radial engines, each mounted in a streamline nacelle below the wing on each side of the fuselage. The fuel tanks are mounted above each engine in the leading edge of the wing. The engines are separated from the wing by a fire wall.

The undercarriage consists of a wheel below each engine nacelle, while a third wheel, completing the landing gear is mounted under the forward part of the fuselage. The two main wheels at the back carry the shock absorbers and the wheel brakes. By this arrangement, with the center of gravity near the rear of the fuselage, it is impossible to nose over. The two rear wheels are placed exceptionally far apart making it almost impossible to turn the machine over on the ground.

The center of gravity is so placed that the loading per unit of area is considerably greater on the forward horizontal surface of stabilizer. If both this surface and the main wing have similar airfoil sections it is necessary to give the forward surface a larger angle of incidence in order to carry this load and produce longitudinal stability. (The same effect may be produced by a combination of different airfoils.) As the angle of attack of the entire plane is increased the forward surface stalls before the main wing nosing the plane downward until stability is again attained. In that way there is an ample margin protecting the main wing from ever stalling eliminating the possibility of a spin. This "margin of protection" is the angle between the incidence of the forward surface and that of the main wing. When the forward surface is at the stalling position the main wing is at an angle less than the stalling angle by this "margin of protection". In order to increase the maximum angle of attack of the main plane this angle between the incidences of the two horizontal surfaces will have to be diminished, decreasing the longitudinal stability. Thus to increase the speed range it is necessary to sacrifice some stability.



Horizontal stabilizer and elevator of the Focke-Wulf "Ente".



A "canard" type biplane built by Voisin in France in 1910 and 1911.

The longitudinal stability of the canard type of plane may be explained in a slightly different manner. By the disposition of the center of gravity, the forward plane carries a greater load and thus must have a greater lift. When angle of attack of the entire craft is increased, the total lift of the plane increases (reducing the speed of the plane). As the plane is nosed upward, the burble point of the forward area is reached first and the lift on that area begins to fall off nosing the plane downward until the plane increases its speed sufficiently for the forward surface to unstall and return the machine to a position of equilibrium (or puts it into a glide). Thus, for any particular combination of wing settings the plane will have a definite speed range at which it is stable. Should the engines be throttled the plane will nose downward assuming a natural angle of glide. If the throttle should be opened the plane will nose upward, automatically climbing. (The relative position of the center of thrust has been neglected.)

The conventionel modern airplane attains its stability in much the same manner, except that on the canard type the main wing cannot reach its stalling angle, and therefore the plane cannot stall (or fall into a spin). But there are many other aerodynamic considerations besides that of longitudinal stability. An unobstructed airfoil meeting the air before any of the disturbing parts of the plane is more efficient. By "disturbing parts" is meant, anything that will tend to disturb the flow over the wing. The airflow over a great portion of the main wing of the Ente is disturbed by the projecting fuselage and stabilizing surfaces. On this type of

machine it is almost necessary to have an even number of engines unless there is to be an odd engine mounted in front of the fin. above the fuselage, having an exceptionally high thrust.

Distribution of weight in the Ente is as follows:

POWER PLANT		
Two engines—Siemens 75 hp.	638	lb.
Two propellers with spinners	66	lb.
Two gasoline tanks (about 24 gal. each)	52.8	lb.
Two tail tanks (about 12½ gal. each)	13.2	lb.
Instruments, piping, etc.	66	lb.
Total	836	lb.
PLANE		
Fuselage with cabin	726	lb.
Wing with ailerons and engine nacelles	528	lb.
Horizontal tail surfaces	132	lb.
Vertical tail surfaces	132	lb.
Front wheel, etc.	33	lb.
Miscellaneous	121	lb.
Total	1,672	lb.
Total weight empty	2,508	lb.
DISPOSABLE LOAD		
Required		
Gasoline for three hours	275	lb.
Oil for three hours	33	lb.
Pilot	176	lb.
Total	484	lb.
Pay load		
Three passengers, 165 lb. each	495	lb.
Baggage	11	lb.
Total	506	lb.
Total gross weight	3,498	lb.

Word was recently received that Herr Wulf, was killed while testing a new type high lift wing monoplane, and it is assumed from the message to be the Ente. No further word was received other than that the plane dropped from a height of 300 ft. The cause of the crash was not stated. However, it is believed that experiments with this design will be continued.

Plan Second Air Meet

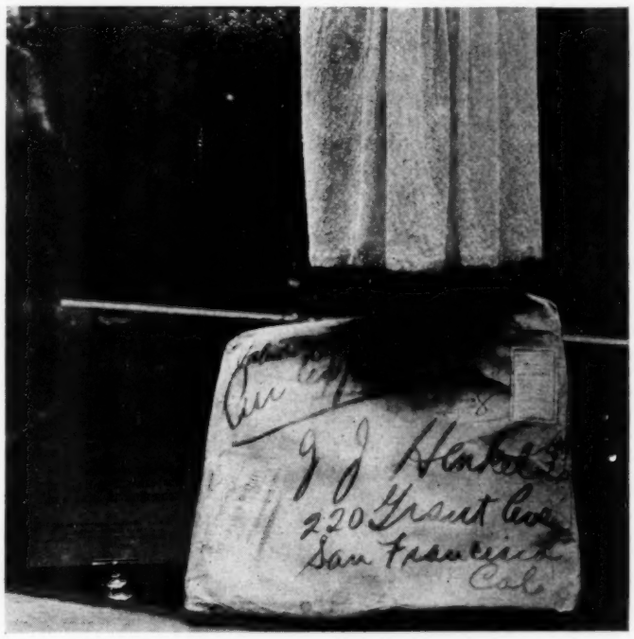
THE FIRST air meet held in South Texas Sept. 10, at which time nearly fifty planes of various types from Brooks, Kelly and Ellington fields participated in maneuvers on the local field, was so successful that a second event is being planned to take place during the dates of the Valley Mid-Winter Fair held at Harlingen from Nov. 24 to Dec. 1. Arrangements are under way for the second meet and it is expected the number of planes participating this time will be greatly augmented owing to the success of the initial maneuvers. The local landing field received enthusiastic approval by visiting fliers and it is expected to be placed on the air mail route from San Antonio to Mexico as soon as arrangements toward that end can be worked out.

Floating Seaplane Dock

A RECENT report from Berlin states that a floating dock, for seaplanes, said to be the first of its kind in the world, was recently launched at the Flanders shipyards in Lubeck. It is stated that the dock was designed with a view to future expansion having a capacity of 100 tons, which is much larger than any seaplane now in service. The dock is expected to be used in connection with a series of experiments with very large seaplanes.

Advertises Air Mail Express

NOT ONLY are San Francisco retail stores now making extensive use of the air mail in securing shipments from the east but they are also advertising the fact to prospective customers. The J. J. Henkel store arranged a display in its window in order to tell the public that they were the first San Francisco store to receive a dress shipped by air mail



Window display of an air mail express shipment

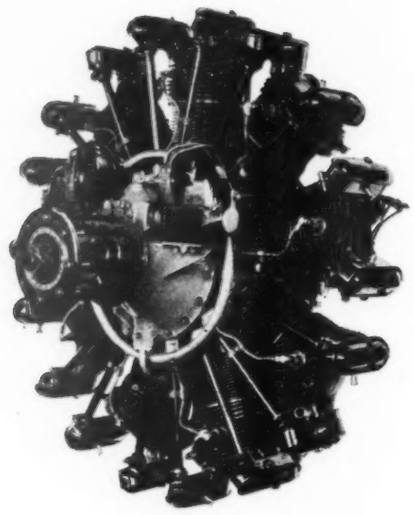
express from New York. As will be noted in the accompanying illustration, the display included the dress, the wrapping paper in which it was mailed and a window card telling about the event. Another shipment that came by air mail was a shipment of men's hats which were displayed together with the box in which they were received in the store window. Both of these displays attracted a great deal of attention.

Enroll Chinese Student Pilots

FORESEEING A period of intense aeronautical development in China, William Kay and Norman Poy, full blooded Chinese, have enrolled for a six months course in practical aviation at the Marshall Flying School of Marshall, Mo. According to Mr. Poy, aviation is more or less stagnant in China only because there is a lack of aeronautical knowledge, and he foresees tremendous possibilities in commercial aviation for anyone who will apply modern American business methods and thorough aeronautical knowledge with an understanding of the Chinese nation.

Both Mr. Poy and Mr. Kay are college graduates, and write and speak English fluently. They are both taking a full flying course and a full ground course and will also study aeronautical merchandising and business methods. Mr. Poy, who was born in Canton, China, is already a graduate of an engineering college, and in the Marshall Flying School is specializing on flying instruction while Mr. Kay is specializing on the mechanical or ground work of aviation. Upon completion of their courses both men will leave immediately for China where they will go into the Aviation business on a large scale.

Fuel *for the* Wright "Whirlwind"



By E. T. JONES

Chief Engineer, Wright Aeronautical Corp.

THE PERFORMANCE of an aircraft engine is so closely related to the properties of the fuel used that it is necessary for the engine manufacturer to specify a lowest quality of fuel which may be used satisfactorily in an engine. The engine operator frequently finds this restriction troublesome as in certain localities it is difficult to secure fuel of the desired quality and there is no simple quality test which can be readily applied at the time the fuel is purchased. The operator who has experienced these difficulties is apt to inquire why the engine manufacturer does not design his engine to run satisfactorily on ordinary commercial automobile gasoline, thus avoiding the constant danger and inconvenience involved in so constructing the engine that serious damage is apt to occur if an improper grade of fuel is used. His attitude on this point is probably based on a failure to appreciate how great a sacrifice in engine performance would be necessary in order to meet his desires.

Continuous Detonation Creates Trouble

In the first place, it might be pointed out that the average automobile engine falls far short of satisfactory full throttle operation when using the poorer qualities of motor gasoline on the market. In the majority of automobile engines violent detonation arises if the engine is forced to operate at heavier loads for any appreciable length of time. With the relatively heavy construction employed in the automobile engine this detonation, while annoyng, is not particularly dangerous. On the other hand, with the lighter construction employed in aircraft engines continuous detonation is certain to be followed by disastrous results. Use of the lower grades of fuel also leads to distribution of troubles tending to make the engine run unevenly and to eliminate this trouble complicated heating devices are required which both increase the weight of the engine and reduce the maximum power output. To sum the matter up briefly it may safely be stated that if the engine manufacturer were to design his engine to operate smoothly and safely on the poorer grades of motor gasoline, he would find the power output from a given size engine reduced by at least 30% and it is probable that the unit weight would be increased by an even larger percentage.

The selection of a suitable aviation fuel is largely a matter of balancing increased cost against superior engine performance. This matter was carefully considered by the Federal Petroleum Board in drawing up the government specifications for domestic aviation gasoline and these specifications represent an excellent compromise from all points of view. In any event the government's standard having been established, it is obvously to the advantage of commercial interests to follow this standard and not to complicate the situation by the introduction of a different standard for commercial work.

There are three principal characteristics of the fuel which largely determine its performance in an internal combustion engine. These are its purity, its volatility, and its anti-knock value. The custom built up by the refiners of grading fuel according to its specific gravity is unfortunate from the point of view of the engine operator as, while the specific gravity throws some light on the properties mentioned above, it does not itself have any real connection with the behaviour of the fuel in an engine. The principal requirements of the government specifications for domestic aviation gasoline are listed below:

(1) The gasoline shall be free from water and suspended matter.

(2) Color—The color shall not be darker than No. 25 Saybolt.

(3) Doctor test.—The doctor test shall be negative.

(4) Corrosion test.—One hundred c.c. of the gasoline shall cause no gray or black corrosion and the amount of deposit when evaporated in a polished copper dish shall not exceed 3 mg.

(5) Distillation range.—The temperature limits are as follows:

When 5% of the sample has been recovered in the graduated receiver, the thermometer shall not read more than 75° C. (167° F.), or less than 50° C. (122° F.).

When 50% has been recovered in the receiver, the thermometer shall not read more than 105° C.(221° F.).

When 90% has been recovered in the receiver, the thermometer shall not read more than 155° C. (311° F.).

When 96% has been recovered in the receiver, the thermometer shall not read more than 175° C. (347° F.).

The end point shall not be higher than 190° C. (374° F.).

At least 96% shall be recovered as distillate in the receiver from the distillation.

The distillation loss shall not exceed 2% when the residue in the flask is cooled and added to the distillate in the receiver.

(6) Acidity.—The residue remaining in the flask after the distillation is completed shall not show an acid reaction.

(7) Sulphur shall not be over 0.10 per cent.

Items 1, 2, 3, 4, 6, and 7 are aimed to insure freedom from acids, gum forming compounds, sulphur, and other undesirable impurities. Item 5 covering the distillation range insures proper volatility. It should be noted that a minimum, as well as a maximum, initial boiling point is given as it is

desired to exclude the extremely volatile fractions contained in the crude from which the fuel is manufactured. Too low initial boiling point is apt to be troublesome in several ways. In the first place it is obvious that a fuel that vaporizes rapidly at a temperature below 122° F. is apt to be extremely dangerous. Moreover, fuel of this character is likely to boil in the carburetor float chamber or the fuel lines near the engine resulting in uneven running and it is also difficult to handle this fuel in the ordinary type of fuel pump when any considerable suction is involved.

Engine Condition Influences Test Results

It will be noted that the above specification makes no reference to the anti-knock qualities of the fuel and unfortunately this property is not covered by any of the tests specified. We thus find ourselves in a position where we have no adequate specification to cover one of the most mportant properties of the fuel. This situation arises from the fact that as yet no satisfactory laboratory test for definitely fixing the detonation characteristics of the fuel has been devised. A great deal of research work is being done along these lines and it seems safe to predict that in the near future a satisfactory solution of this difficulty will be developed. At present the only reliable method consists in comparing the performance of the given fuel in a given engine with the performance of some standard fuel in the same engine. Unfortunately the type and the condition of the engine seriously influence the results of such tests, hence it is impossible to devise a standard test which can be duplicated in different laboratories utilizing different engines.

In spite of the fact that we are at present unable to definitely specify the anti-knock properties of a fuel, there is a great deal of information available regarding this property which generally enables us to secure fuels which are satisfactory in this respect. In the first place, regardless of the type of crude from which the fuel is distilled, there is a general tendency for the anti-knock value to improve as the boiling point is lowered; thus in general the so-called high test gasolines are superior in anti-knock value to the low test gasolines. In the second place the type of crude from which the fuel is manufactured has a pronounced influence on its anti-knock qualities. The California crudes are by far the best in this respect. The Texas and Mid-Continental crudes are about equal and occupy a middle position, whereas the Pennsylvania crudes yield fuels which are lowest in anti-knock value of any fuels derived from American crudes. With these facts in mind the operator has only to assure himself that the distillation range meets the requirements of the government specification for domestic aviation gasoline. In placing the Wright "Whirlwind" engine on the commercial market it was the intention to permit the widest possble selection of fuels, hence the design was so adjusted that the engine would run satisfactorily on any American fuel meeting the government specifications for domestic aviation gasoline. However, inasmuch as the fuels derived from Pennsylvania crudes are definitely inferior in anti-knock properties, the use of these fuels is to be avoided whenever possible. The United States Navy recently conducted a long full throttle non-stop test of a Whirlwind engine using Pennsylvania domestic aviation gasoline and, while the test indicated that the engine would stand up satisfactorily, it also showed clearly that the operating temperature was considerably higher than was the case when a better grade of fuel was employed.

A Quick Change Artist

A German acrobat named Hammer recently reversed the usual procedure by changing from plane to boat. As the photo shows he hung suspended on a rope ladder attached to a plane piloted by the German airman Raab, and at the proper moment stepped aboard the motor boat Opel II as it sped through the waters of a lake near Potsdam.

Two Fuels Recognized by the Services

The tendency of an engine is to detonate not only on the grade of fuel but to a considerable extent upon the quality of the mixture, rich mixtures being quite efficient in suppressing detonation. This makes it possible for the operator to control detonation to a certain extent by the use of a mixture control. If there is any doubt as to the anti-knock properties of the fuel, the mixture control should be left in the full rich position for all full throttle operation. While flying at part throttle it is usually perfectly safe to lean the mixture out even with a fuel of relatively poor quality.

As stated above, a great deal of research work is being done throughout the industry on the anti-knock properties of fuels, and numerous new types of fuel are being placed on the market which are supposed to have properties superior to the ordinary product. Most of the manufacturers are perfectly sincere in setting up claims regarding the superior properties of their fuels but the aircraft operator is warned to be extremely careful in committing himself to the use of these new fuels. It may safely be stated that the majority of them are not suitable for use in aircraft engines having a higher compression ratio than 5 to 1. Of the hundreds of new fuels recently put on the market, only two have been recognized as being satisfactory by the Army and Navy Air Services. These are gasoline blended with benzol or with tetra-ethyl lead and even these fuels must be used with caution, as it is not sufficient to insure a suitable anti-knock value unless the other requirements as to purity and volatility are complied with. Commercial benzol is particularly apt to contain impurities which more or less destroy its anti-knock value and in many cases these impurities are of a highly corrosive character which renders their introduction into the engine extremely dangerous. In cautioning the purchasers against many of the new fuels placed on the market, it is not intended in any way to reflect on the sincerity of the manufacturer of this fuel. The purchaser should, however, remember that rough and ready field tests are apt to be very misleading and that thorough laboratory facilities of the fuel manufacturer.

This fact is well illustrated by a recent experience of the Wright Company. They were approached by one of the largest petroleum companies with the request to test a new fuel which they were marketing. These tests were undertaken with their positive assurance that the fuel had marked anti-detonating properties and was in other respects suitable for

use in aviation engines and there is no doubt but that the manufacturer was absolutely sincere in his claims. However, it required less than five minutes full throttle operation of a Whirlwind engine to burn a hole completely through the head of one piston and seriously damage several other pistons. This result was, of course, a great surprise to the fuel manufacturer who had entirely failed to appreciate the wide difference between ordinary motor car operation and full throttle operation of a modern aviation engine.

The operator is also warned to be skeptical of claims that a given fuel will materially increase the power output of his engine. Providing the fuel is sufficiently volatile to give good distribution and has sufficent anti-knock value to avoid detonation, very little improvement in engine operation can be secured by utilizing a much higher grade fuel. Tests conducted in the Wright factory indicate that without changing the design of the engine, little advantage can be gained from fuels of unusually excellent quality.

Untried Fuels to be Avoided

Summarizing the entire situation, the operator should bear in mind that while serious damage will invariably result from the use of fuel inferior to that specified, there is very little to be gained by the use of fuel superior to that specified. The important qualities of a fuel are purity, volatility, and anti-knock value. A satisfactory fuel for Whirlwind engines will be secured if the purchaser avoids Pennsylvania crudes and insists that his fuel meet the requirements of the government specification for domestic aviation gasoline. New and untried fuels are to be avoided as at best very little can be gained if the fuel proves to be superior to good domestic aviation gasoline. On the other hand, very serious damage is apt to result if the fuel turns out to be below the domestic aviation standard. He should not place too much reliance on field demonstrations as these are very apt to be misleading. A slightly different setting of the mixture control could easily offset the difference between two fuels being compared. Weather conditions and the character of flying also make accurate comparisons difficult. Purchase fuel from reliable producers who have a reputation to maintain rather than from new concerns who are trying to establish a reputation. The government laboratories are continually searching for improved fuels and that out of the thousands tested benzol and ethyl gasolines are the only two that have been approved for Army and Navy use. Other things being equal, fuels from California crudes are always preferred. However, in the case of the Wright Whirlwind engine, this preference does not warrant a substantial inconvenience either as to availability or price. Finally, while specific gravity is the basis of the usual trade classification for fuels, this property has no direct relation to the performance of the fuel in an aircraft engine.

Specifications for domestic aviation gasoline are contained in the instruction book furnished with each Wright Whirlwind engine. These specifications agree in general with those now in use by the Army, the Navy, and the Bureau of Mines. Reliable tests to determine the compliance of any sample of gasoline with these specifications can be made at reasonable cost by any reputable, copetent consulting chemist or petroleum technologist, who can also usually determine the source of the crude from which the gasoline was distilled and thereby appraise its anti-knock value for practical purposes.

Fuel Supply Stations Marked

IN A report to the Aeronautics Branch of the Department of Commerce, the Standard Oil Co. of Indiana states that most of its fuel supply stations in ten states have markings on the roof for the guidance of aircraft. The program of the company, it is stated, contemplates the marking of 4,200 stations, each of which will be stocked with aviation fuel and oil. Generally no arrow or compass direction has been used in these signs but the top of the letters face true north. Reading the sign from the south, the pilot knows that the opposite side of the sign is north.

Canadian Ship to Shore Plane Experiments Prove Successful

AN EXPERIMENT was recently successfully carried out in Canada with a steamship and airplane combination for the saving of time for incoming and outgoing mails. This air mail service is to link up many of the principal Eastern Canadian cities with British mail ships. The service is said to cut more than two days from the time required by regular train routes. Covering more than 1,000 flying miles, two Canadian planes brought English mail from ships far up the St. Lawrence River to inland points, which usually did not receive mail until forty-eight hours after the vessels had docked.

Outgoing mail left Montreal by a Canadian Airways seaplane at noon and in a litle more than three hours arrived at Rimouski, Quebec, a distance of 300 flying miles, where the mail was placed aboard the Empress of Scotland, bound for Europe.

Meeting the SS *Mount Royal* before it had docked at Rimouski, British mail was put aboard a plane and in about three hours the plane dropped its cargo at Quebec.

At Quebec the Rimouski plane was met by another machine which rushed the incoming steamer mail to Ottawa, reaching the capital 48 hr. ahead of the regular train schedule. Continuing on its journey, the plane from Rimouski hopped off with mail from Montreal, Toronto and Winnepeg, and mail for these cities arrived and was distributed that afternoon.

Haskelite on Winning Planes

AT THE National Air Races held in Spokane, Wash., in September, Haskelite maintained the high average of use in prize-winning planes demonstrated last year at Philadelphia, in the Ford Reliability Air Tour in July, in Colonel Lindbergh's and other record-breaking flights.

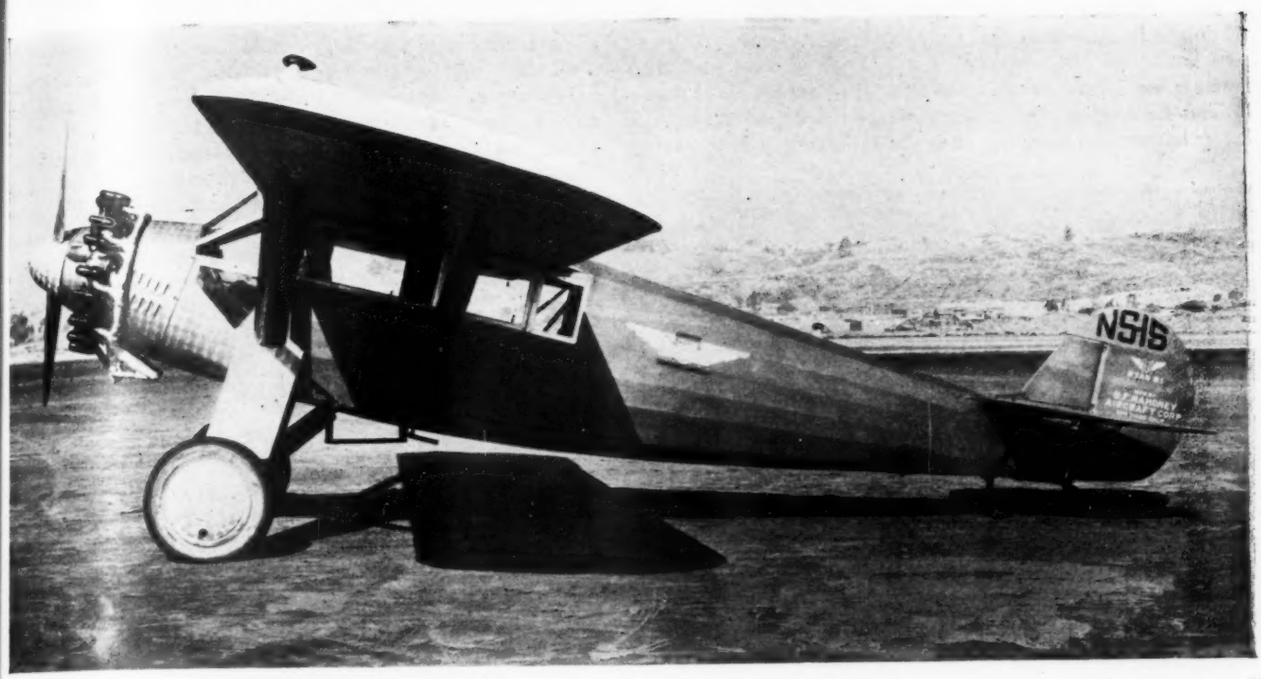
The Haskelite company states that in the air derby races from New York to Spokane and from San Francisco to Spokane, 14 of the 17 planes which received prize money were equipped with Haskelite. Every first prize winner was a Haskelite-built plane.

Thirty-nine of the forty-five prize winners in the twelve National Air Races held at Spokane were planes having important parts of Haskelite. All of the first-prize winners in the speed races were Haskelite-equipped, and in nine of the twelve events planes built with this blood-glue plywood made a clean sweep of the prize money.

A Training Plane Height Record

ACCORDING TO a Michigan report, Lieut. Henry H. Ogden, mechanician on one of the Army 'round the world planes and now a member of the 107th Observation Squadron, Michigan National Guard established a record for altitude with a Consolidated PT-1 training plane during a flight made Oct. 21, when he reached an altitude of 16,100 ft. He was accompanied by John T. Nevill.

The flight was made on an unusually clear day and most of the climb was made over the city of Detroit but at 10,000 ft. the fliers stated they struck a wind that carried them 15 mi. into Canada although they headed the plane into wind with an air speed of about 70 m.p.h. They reported that Lake Huron, Lake St. Clair and Lake Erie were visible and cities from Port Huron to Cleveland and west to Jackson, Mich. were visible also.

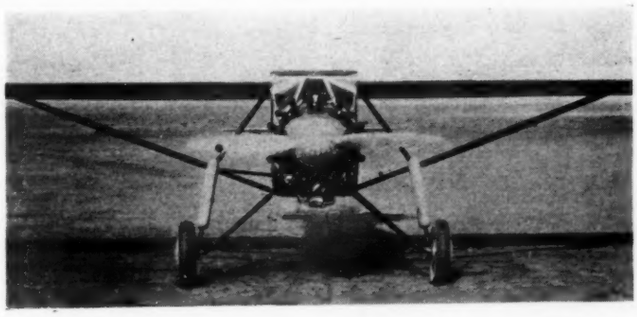


Side view of the Ryan Brougham (Wright Whirlwind)

Ryan Brougham Monoplane

A Sister Plane of the "Spirit of St. Louis" and is Powered With a Wright Whirlwind Engine

THE ACTIVITIES of the B. F. Mahoney Aircraft Corp., formerly the Ryan Airlines, Inc., builder of the "Spirit of St. Louis" have been the object of considerable attention since Col. Charles A. Lindbergh's trans-Atlantic flight. The company is now producing on a production basis the Ryan Brougham or Ryan B-1, a five place cabin monoplane powered by a Wright Whirlwind J5C engine. It is a conventional semi-cantilever monoplane with a welded steel fuselage and wood wings. The empennage is also of welded steel tubing with the horizontal surfaces braced in a manner similar to the wings. The undercarriage is mounted on the wing braces giving an exceptionally wide tread.



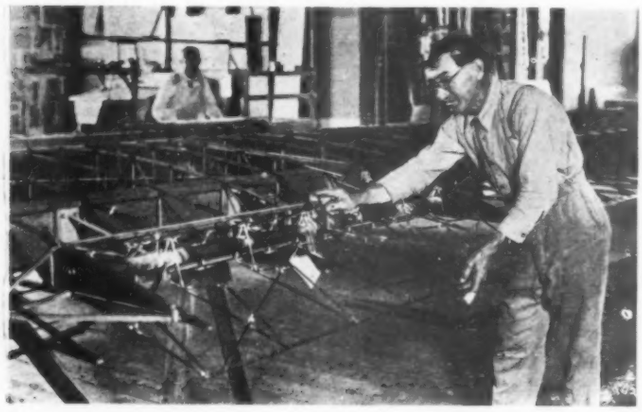
Front view of the Ryan Brougham, manufactured by the B. F. Mahoney Aircraft Corp.

The Brougham is streamlined to give the best aerodynamic efficiency consistant with the manufacturing processes available. Any section of the fuselage, through the longitudinal axis will give a streamline section. The plane is very stable in flight yet easily maneuvered. A wide range of stabilizer adjustment (nine degrees) is provided which permits the plane to fly equally well with full load or pilot alone. The full load consists of a pilot and four passengers with four or five suit cases in addition to sufficient fuel for a cruising range of 750 mi. Weighing 3,100 lb. loaded the B-1 has a high speed of 126 m.p.h. with a landing speed of 49 m.p.h.

Beneath the wing is the passengers' cabin with the pilot's cockpit at the front under the leading edge. Behind the passenger seats is a compartment large enough to accommodate four or five suit cases. The cabin is heavily upholstered with blue velour laid over a packing of Balsam Wool. This packing minimizes engine and propeller noises besides acting as an excellent insulator against extreme temperatures outside. The sides and front of the cabin are fitted with glass windows giving good vision forward, to the sides and downward. The side windows slide either fore or aft to be opened, while the windows at the sides of the pilot's seat are adjustable up and down for landing in bad weather. At each side of the cabin is a door providing easy entrance or exits. Safety belts are standard equipment. The cockpit is fitted with conventional stick and pedal controls with the engine controls and instruments conveniently grouped in front of the pilot. All controls are actuated by 1/8 in. dia. 7 by 19 stranded aviation cable ferruled and are attached to control horns through Micarta pulleys. Foot pedals are provided for brake mechanism to allow installation of brake control cables if desired.

The fuselage is of welded steel tubular members built into

a Warren truss. The members are joined with butt welds, all joints being made with a 30 deg. scarff sclice. The engine is mounted on a conventional circular welded steel tube frame pin jointed to the fuselage structure by four bolts. Behind the engine and in front of a fireproof bulkhead is a 5.2 gal. copper oil tank. It is mounted inside the cowling



Showing welded aileron construction on the Ryan Brougham. Horn is welded to aileron spar.

above the engine mount. The two main fuel tanks of 41½ gal. each are mounted in the wing.

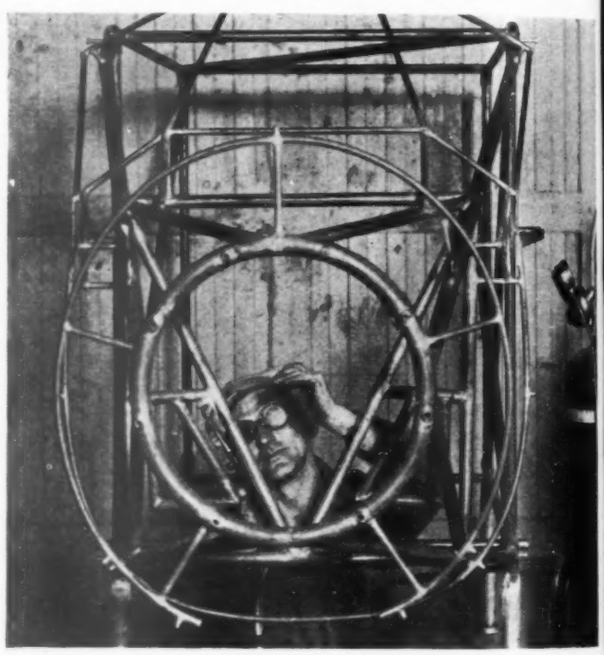
The wing is built in one continuous panel attached to the fuselage at the upper longeron with a steel fitting. The wing is also braced by two external tubular supports on each side of the fuselage. These "lift" struts are of 1025 steel tubing streamlined with balsa wood to have an airfoil section. By means of an adjustment with a positive locking device at the upper ends the wings can be quickly aligned. The forward tube is 2½ in. dia. and the rear tube is 2 in. dia.

The structure of the wing is conventional with I section spars built up of three laminations of spruce; casein glue being used throughout. The ribs are of the truss type; all webs and cap strips have 1/16 in. Haskelite plywood gussets at the joints. Drag bracing is by a single system of steel wire and turnbuckles, with the main fittings of 1025 sheet steel having sufficient thickness to reduce the bearing areas to 30,000 lb. per sq. in. The ailerons are of welded 1025 steel tubing assembled and welded all on master jigs to permit interchangeability. The aileron structure is protected both inside and out against corrosion. The ailerons are hinged on a hollow pin with an alemite connection for greasing.

In the wing are two terneplate fuel tanks externally prepared against corrosion. Provision is also made inside for the passing of drag wires through the tanks.

The tail surfaces are similar in structure to the ailerons being of welded 1025 steel tubing protected both inside and out against corrosion. The control surfaces are actuated by cables and, as has been mentioned before, the horizontal stabilizer can be adjusted through nine degrees. These surfaces are also built in a master jig making them interchangeable.

The landing gear has an exceptionally wide tread and is mounted on the wing lift struts with supporting struts extending to the upper and lower longerons. Thus the undercarriage may be called the split axle type with each side independent of the other. A trombone type of rubber shock absorber is used with the main members which are of chrome molybdenum steel tubing, pivoted at the upper end at the wing lift strut, and in addition, are braced to the fuselage. The axle is of heat treated steel tubing and is equipped with



Welding the engine mount on the Ryan Brougham. Engine unit is attached to the fuselage by four bolts.

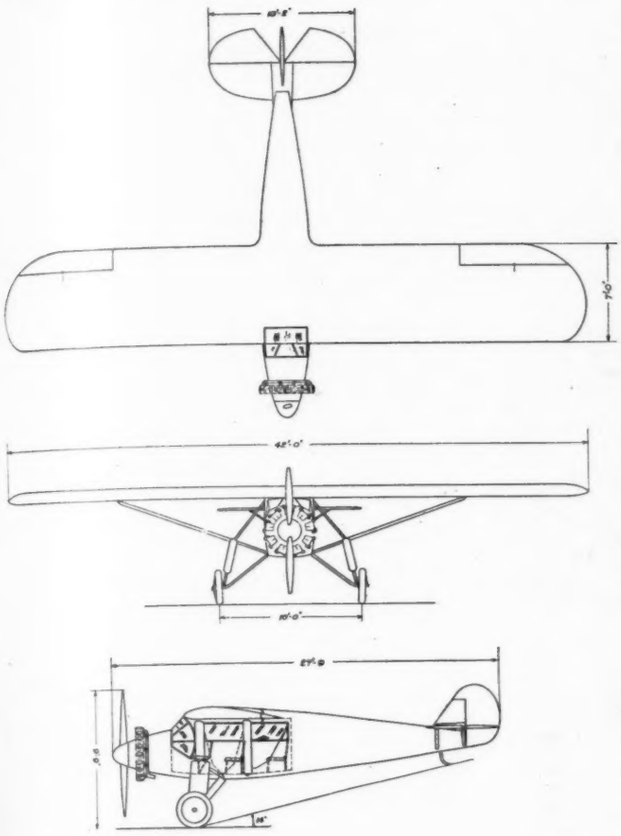
Showing the method of inspecting the tail skid installation on the Ryan Brougham.

fittings necessary for the installation of brakes if desired.

The tail skid consists of two chrome molybdenum tubes one telescoping inside the other. The outside tube is the tail skid proper while the inside one, or the attachment tube, is pivoted at the top to allow the tail skid to swing around. Vertical loads are taken by vertical shock chords which allow the skid to slide up and down on the inner tube. Drag forces in landing are resisted by a set of horizontal rubbers which allow the skid, as it pivots on its upper bearing, to move backwards against the pull of the rubbers. The swivel action is resisted by the vertical rubbers. The fabric on one side of the fuselage can be quickly opened by the use of hookless fasteners for inspection of the tail skid mount or stabilizer adjustment.

The general specifications and performance figures for the Ryan Brougham, as supplied by the manufacturer, are as follows:

Span	42 ft.
Chord	7 ft.
Length, overall	27 ft. 9 in.



Three view drawing of the Ryan Brougham.

Height, overall	9 ft. 10 in.
Area of stabilizer	22 sq. ft.
Area of elevators	15.6 sq. ft.
Area of rudder	9.0 sq. ft.
Area of fin	2.5 sq. ft.
Area of wing, including ailerons	294 sq. ft.
Wing section	Clark Y
Angle of incidence	none
Dihedral	none
Max. width of fuselage	3 ft. 6 in.
Tread of wheels	10 ft.
Propeller diameter	9 ft.
Gasoline capacity	83 gal.
Oil capacity	5.2 gal.
Wight empty	1800 lb.
Pay load	800 lb.
Total useful load	1500 lb.
Gross weight	3300 lb.
Maximum speed	126 m.p.h.
Landing speed (full load)	49 m.p.h.
Climb with full load, still air	900-1200 f.p.m.
Service ceiling	16,000 ft.
Take off, full load, still air	610-660 ft.

Air Mail Stops in Ohio

THE POST Office Department has designated, according to a report by the Department of Commerce, a number of air mail stops in the state of Ohio on the Louisville-Cleveland airway, a preliminary survey of which is nearing completion. These cities include Akron, Cleveland, Cincinnati, Columbus, Dayton and Louisville. Great interest is said to have been aroused in various towns along the airway. Many of them are said to be already negotiating for fields to be turned over to the Government for $1 a year.

Aircraft Export Figures for the First Six Months of 1927

EXPORTS OF aircraft parts, except tires, from the United States, during the first six months of 1927, are as follows:

Country	Value
Canada	$63,731
Soviet Russia in Europe	36,103
Chile	34,878
United Kingdom	30,054
Cuba	6,776
Dominican Republic	2,800
Mexico	4,669
Brazil	1,660
Peru	1,479
Argentina	1,419
Germany	1,209
Java and Madura	1,040
Italy	900
France	645
Newfoundland	503
Philippine Islands	427
Australia	400
Other British West Indies	192
Colombia	148
Other Dutch East Indies	75
Czechoslovakia	70
Total	$189,178

Engine exports for the same period are:

Country		Value
Canada	53	$24,163
Belgium	2	28,103
Mexico	2	21,055
Japan	2	19,000
Germany	2	2,326
Switzerland	1	10,000
Argentina	1	5,016
Czechoslovakia	1	4,610
Poland & Danzig	1	4,260
Spain	1	4,100
British South Africa	1	790
British Malaya	1	409
Australia	1	25
Total	69	$123,892

Exports of airplanes, seaplanes and other aircraft for this period are:

Country	No.	Value
Chile	7	$187,500
Canada	3	5,845
Belgium	2	28,000
Japan	1	33,500
Colombia	1	27,305
Brazil	1	16,239
Argentina	1	8,875
Australia	1	3,421
Spain	1	350
Netherlands	1	75
Total	19	$311,610

Correction

ON PAGE 941 of the Oct. 17 issue of AVIATION it was stated in error that E. A. Johnson was president of the Boeing Airplane Co. It should have been that Mr. Johnson is president of Johnson Airplane & Supply Co., of Dayton, O.

© Pacific Air Transport

Valspar thrives on Weather *—good or bad*

WINDS beat, sun scorches, storms rage, fogs attack; but Valspar has survived thousands of battles with the elements—and always comes through smiling.

That's why Valspar is the most widely used airplane finish today, —and has been since the earliest days of flying.

That's why Valspar is used on the planes of the Pacific Air Transport which fly one of the longest and most trying air mail routes in the world: from Los Angeles to Seattle.

That's why Valspar and Nitro-Valspar were used to protect the Ryan monoplane "Spirit of St. Louis" on its never-to-be-forgotten trans-oceanic flight.

At left—Pacific Air Transport pilot about to take off from Los Angeles at midnight in his Nitro-Valsparred plane for a 14-hour trip to Seattle

And Nitro-Valspar *is making history*

FIVE of the Pacific Air Transport planes—three Ryans, one Roamair and one Swallow—are protected with Nitro-Valspar, concerning which that company's Superintendent says:

"I like Nitro-Valspar because we can dope right over it. It is very quick to dry and once a ship is finished with Nitro-Valspar the finish remains for an indefinite period."

Men who are in the best possible position to judge a finish—under the hardest of service conditions month in and month out—like one which without alibis stands the gaff.

That's reason enough for choosing Nitro-Valspar.

NITRO-VALSPAR

The Valentine *all-lacquer finish*

VALENTINE'S
VALSPAR
The Varnish That Won't Turn White

© Pacific Air Transport

VALENTINE & COMPANY
456 Fourth Ave., New York, N. Y.
Chicago Boston Detroit
W. P. Fuller & Co., Pacific Coast

That's why More Pilots fly them!

THE extensive use of the Ryan Brougham on mail routes on the Pacific Coast has demonstrated it to be a worthy companion of its sister ship "The Spirit of St. Louis".

The remarkable performance of this plane is built upon sound engineering design plus excellent construction—and the installation of Wright Whirlwind Engines. Deeply cushioned chairs, heavily insulated cabins, easy of access with splendid ventilation, together with excellent vision all combine to provide convenience and comfort for both passenger and pilot that is unusual...The durability, reliability and safety of Wright Whirlwind Engines in private flying is proverbial. Their splendid performance in the many overseas flights and in over 4,635,000 miles of military and commercial flying during 1926 confirms the faith that experienced fliers and aerial commercial operators have in this Superlative Engine.

Send for Bulletin No. 17 R.

WRIGHT AERONAUTICAL CORPORATION, *Paterson, N. J., U. S. A.*

WRIGHT Whirlwind
A SUPERLATIVE AERONAUTICAL
engine

FLIGHTEX FABRIC

REGISTERED U.S. PAT. OFF.

The World's Premier Fabric

Colonel Lindbergh while flying toward Paris drove his plane through a heavy storm of wind, rain, and sleet for ten hours. On inspection of the plane in Paris it was found to be in excellent condition. It was protected by Flightex Fabric and Tape.

A NOTE TO:

Aircraft Designers
Aircraft Constructors
Aircraft Operators

Your plane when covered with Flightex has an added distinction of quality.

B. F. MAHONEY AIRCRAFT CORP.
SAN DIEGO, CALIFORNIA

October 21, 1927.

E. S.Twining & Co.,
320 Broadway,
New York City.

Attention: Mr. William P. Gaffney.

Gentlemen:

Our purchasing department advises me that Flightex Fabric is the best material available for the covering of our planes, originally using it on the "Spirit of St. Louis" we have had no occasion to consider adopting any other type.

We are now producing two Wright Whirlwind equipped Broughams per week and are contemplating increasing this production to a ship per day as soon as it is practically for us to expand.

We have mailed to Aviation an excellent photograph showing your fabric being used to cover one of our wings.

Very truly yours,

B. F. MAHONEY AIRCRAFT CORP.,
(Owners of Ryan Airlines)
A. J. Edwards, Sales Manager.

AJE:R

E. S. TWINING & COMPANY

320 Broadway, New York, N. Y.

Cable Address: Flightex ***Code: ABC 6th Edition***

PIONEER INSTRUMENTS

. . . guided Lindbergh to Paris in that most famous of all Ryans, the "Spirit of St. Louis". Pioneer Instruments are used wherever quality and performance are demanded. Lindbergh said of his Pioneer Instruments:

Laymen have made a great deal of the fact that I sailed without a navigator and without the ordinary stock of navigating instruments, but my real director was my earth inductor compass.

I also had a magnetic compass, but it was the inductor compass which guided me so faithfully that I hit the Irish coast only three miles from the theoritic point that I might have hit if I had had a navigator.

I replaced a navigator's weight by the inductor compass. This compass behaved so admirably that I am ashamed to hear anyone talk about my luck.

Maybe I am lucky, but all the same I knew at every moment where I was going.

How He Kept His Course

The inductor compass is based on the principle of the relation between the earth's magnetic field and the magnetic field generated at the compass.

When the course had been set so that the needle registered zero on this compass, any deviation, from any cause, would cause the needle to swing away from zero in the direction of the error.

By flying the plane with the needle at an equal distance on the other side of zero and for about the same time the error had been corrected, and the plane would be back on her course again.

This inductor compass was so accurate that I really needed no other guide. *Reprinted from The New York Times of Monday, May 23rd, 1927*

PIONEER INSTRUMENT COMPANY

754 Lexington Avenue, Brooklyn, New York

639 So. San Pedro Street, Los Angeles.
97 Boulevard St. Michel, Paris.
15 Spear Street, San Francisco.
Sternplatz 4, Johannisthal, Berlin.

General European Representative,
M. Calderara, 11 bis Rue Montaigne, Paris, France.

Standard Steel Propellers are used on Mahoney Planes

Five place Ryan Brougham recently delivered to the U. S. Department of Commerce

STANDARD Steel Adjustable Pitch Propellers have been used on Ryan airplanes, which are now manufactured by the B. F. Mahoney Aircraft Corporation, for years.

The most famous of all Ryan planes, The Spirit of St. Louis, in which Colonel Lindbergh made his great flight from New York to Paris is equipped with a Standard Steel.

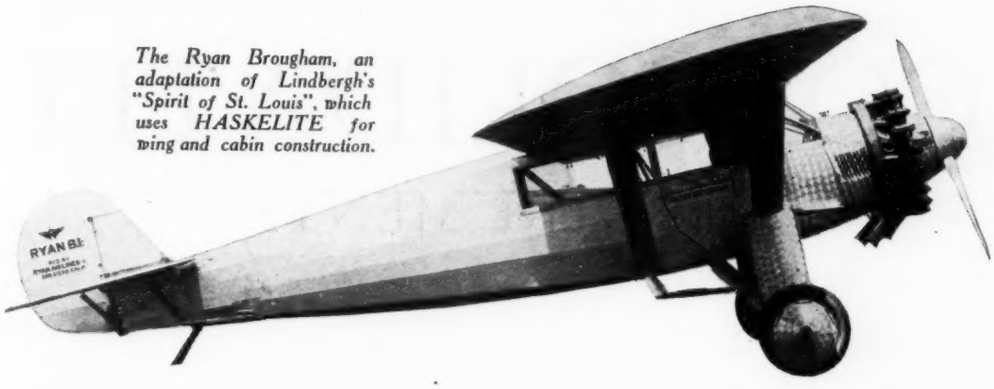
In almost all of the many splendid flights of the past year, Standard Steel Propellers have played an important part. In every case they have functioned perfectly and have proven that they are truly designed to give maximum performance under the most varied flying conditions.

Increased performance and reliability, better resistance to climatic changes and to the effects of rain, hail and salt spray are some of the reasons for the increasing use of Standard Steel Propellers on commercial and military planes.

There are many other reasons which will gladly be sent on request.

STANDARD STEEL PROPELLER COMPANY

General Offices and Works, West Homestead, Pa.



The Ryan Brougham, an adaptation of Lindbergh's "Spirit of St. Louis", which uses HASKELITE for wing and cabin construction.

"As formerly, practically all plywood used in Ryan Planes is HASKELITE"

PLYWOOD
HASKELITE
PLYMETL

HIS statement is from a recent letter of the B. F. Mahoney Aircraft Corporation, manufacturers of the Ryan Brougham and other planes. HASKELITE is used in both wing and cabin construction in the Brougham. It has been applied consistently in the planes turned out by this builder in recent years including the one in which Colonel Lindbergh made his trans-Atlantic hop.

"We" used HASKELITE extensively.

This company is not unique in its preference for HASKELITE. Over 90% of the plywood used in aircraft construction is HASKELITE. It has more than 30 applications. The list includes such structural members as wing ribs, box beams, end and tail ribs, besides uses like leading edges, aileron surfaces, and bulkheads.

HASKELITE versatility and dependability merit your investigation. Information on request.

HASKELITE MANUFACTURING CORPORATION
133 W. Washington Street
Chicago, Ill.

A11-14-Gray

CONSOLIDATED

INSTRUMENTS

(Tachometers, Air Speed Indicators, Oil & Air Gauges)

are now

Standard Equipment on Ryan Planes

Star Pathfinder Compass

Tag Altimeter

Jones Tachometer

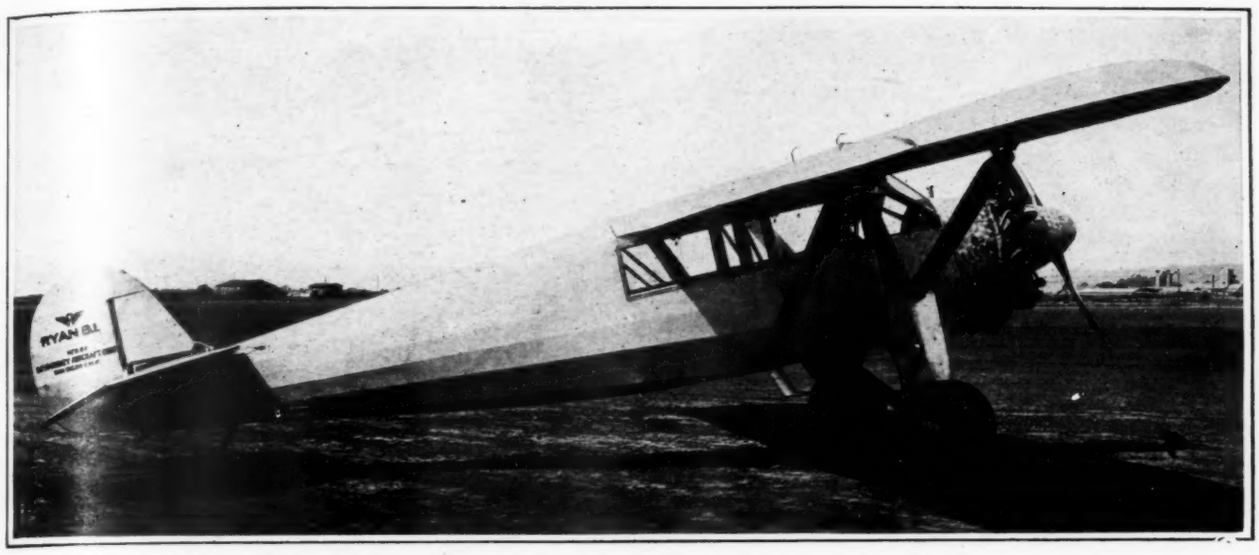
Air Speed Indicator

Oil Pressure Gauge

Consolidated Instrument Company of America, Inc.

41 East 42nd Street, New York City

CONTRACTORS TO THE U. S. ARMY, NAVY AND COAST GUARD

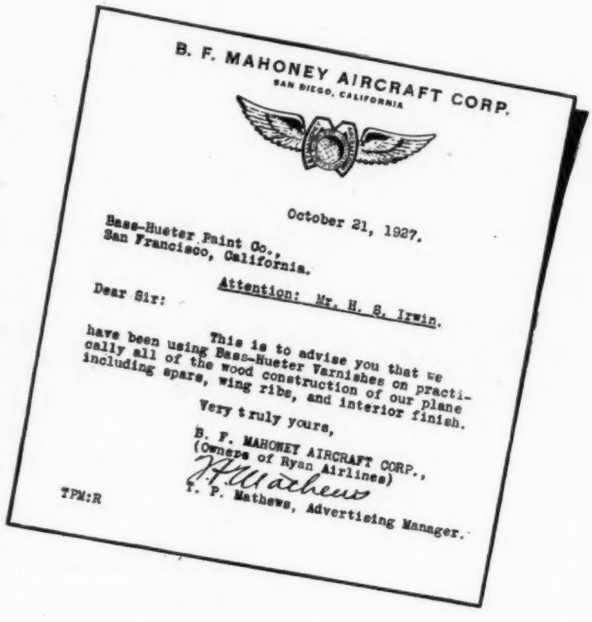


A Varnish Consistent with the Quality of the plane...

BASS-HUETER varnishes were used on that most famous of Ryan planes, the Spirit of St. Louis. Concerning the use of this varnish on the Spirit of St. Louis, absolute verification can be obtained either from the Bass-Heuter Paint Company or direct from the makers of the plane.

The Ryan Brougham now being produced by the B. F. Mahoney Corporation is in every sense of the word a sister-ship to the Spirit of St. Louis. It is a quality product and must have quality materials for even the smallest details of construction. The B. F. Mahoney Corporation can afford to use nothing short of the best materials obtainable. In the important matter of varnish to protect spars and wing ribs and for interior finish they are using, as did their predecessors the Ryan Airlines, Inc., before them, Bass-Hueter varnishes.

If the varnishes you are using are not giving all that you ask in the way of service why not get in touch with Bass-Hueter?



B. F. MAHONEY AIRCRAFT CORP.
SAN DIEGO, CALIFORNIA

October 21, 1927.

Bass-Hueter Paint Co.,
San Francisco, California.

Attention: Mr. H. S. Irwin.

Dear Sir:

This is to advise you that we have been using Bass-Hueter Varnishes on practically all of the wood construction of our plane including spars, wing ribs, and interior finish.

Very truly yours,

B. F. MAHONEY AIRCRAFT CORP.,
(Owners of Ryan Airlines)
T. P. Mathews, Advertising Manager.

TPM:R

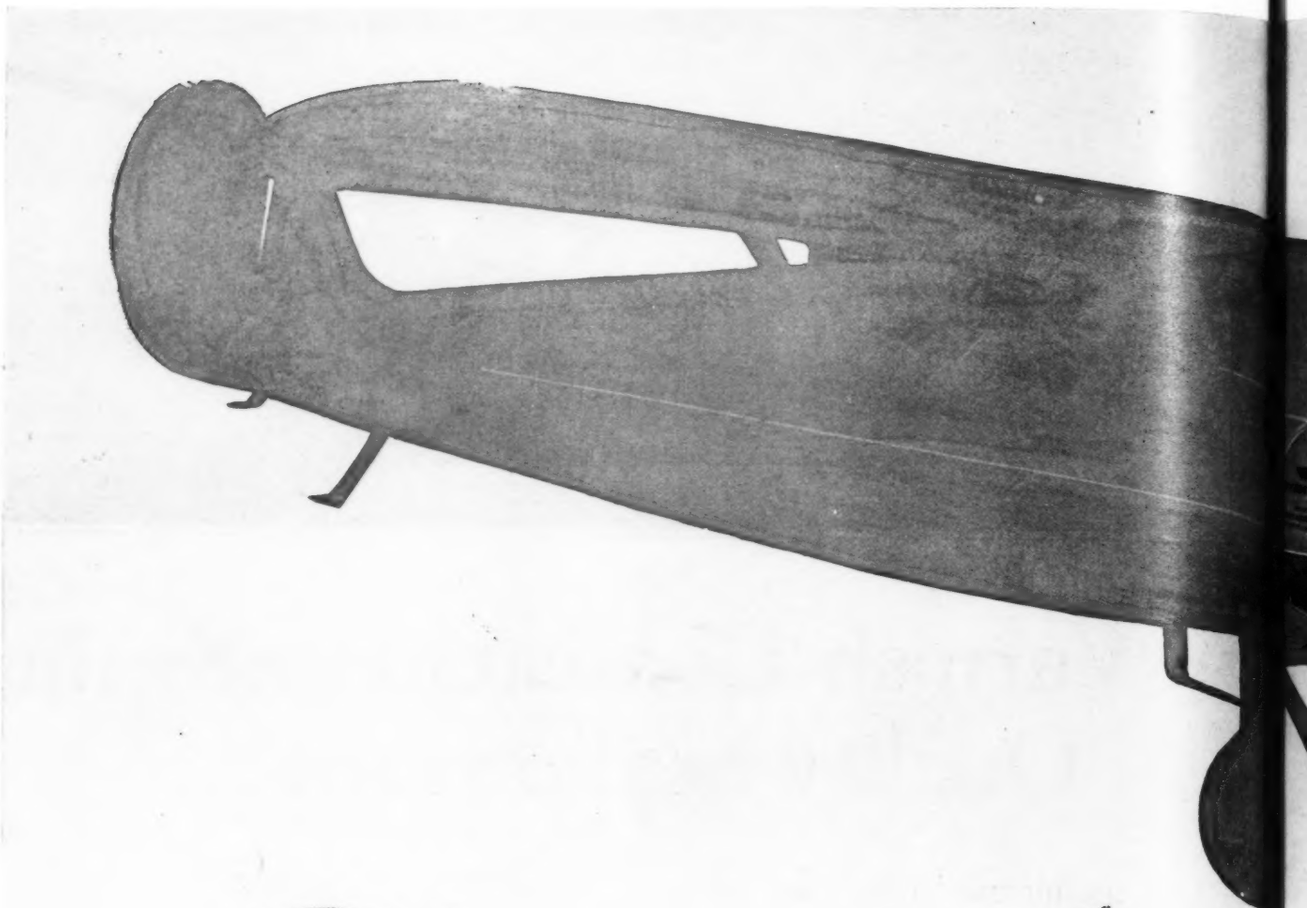
BASS - HUETER PAINT COMPANY

Main Office and Factory
SAN FRANCISCO, CALIF.

Northern Division, Seattle, Wash.

Central Division, San Francisco, Calif.

Southern Division, Los Angeles, Calif.



Sistersh

The Spirit of St. Louis *and the* N

This new five-place Ryan Brougham ... developed from the famous plane designed and built for Colonel Lindbergh ... reflects in quality and workmanship a concentration on a single type and model. It is thoroughly engineered, tested and

Luxurious
Distin
Wright W
$9,70

The B. F. MAHONEY AIRC

RYAN BROUGHAM — *Five-Place!*

proven. The interior, completely upholstered in mohair, has ample room, comfortable seats, perfect visibility, and is easy of access. Ownership of a Ryan Brougham assures you of the utmost in a modern airplane.

T CORPORATION, *San Diego*

Ryans in the Panhandle

Robert H. Gray, late pursuit pilot, 74th Squadron Royal Air Force, operator Bivins Field and agent for Mahoney Aircraft (wearing boots) Col. E. D. Thompson, Hotel man and famous machine gun commander during great war on Gray's left and Mr. Albert Randall, civil engineer on his right, are both students of Gray's Flying School. The Hisso Ryan three place which was delivered to Gray in February last has been flown by him over 50,000 miles (500 hrs.) in all kinds of weather including many night landings without lights and has had only the shock cord renewed twice. In the picture the camera caught E. G. Knapp of Ypsilanti, Mich. having his Brougham serviced at Amarillo's Airport where aviation gasoline and oils are on tap at all times. Service car is kept at field specially for visitors.

Large numbers of planes are taking advantage of the Southern route since the pump station and service facilities were installed at Amarillo some eighteen months ago. The field is marked by large circle and is about three miles slightly west of due north of centre of city.

GRAY'S FLYING SCHOOL

Amarillo Airport, Amarillo, Texas

Start Right !
"We" Did !

A 6000 mile HONEYMOON
in a *Ryan Brougham*

FRANK M. HAWKS
Ryan Aircraft
Houston, Texas

Mayer Flying School

Ryan Brougham, Spirit of Pittsburg

STUDENTS receive the personal attention and interest of competent instructors. After solo flight each course student is given additional flying practice in modern aircraft. Training ships consist of Waco, Oriole and Ryan Wright Whirlwind. Our school is complete in every detail.

AERIAL PHOTOGRAPHY

Passengers carried anywhere there is air. We have been in business eight years without injury to any passenger. Our passed reputation is your guarantee.
We contract for parachute jumps anywhere.

AGENTS FOR RYAN MONOPLANES

Same as the ship that Lindbergh used in his flight to Paris.
Write for prices and information.

MAYER
Aircraft Corporation
Bridgeville, Penn.

KNAPP
Flying Service
Inc.

Distributors of

RYAN AIRPLANES

Ypsilanti Airport, Ypsilanti, Michigan

Ryan Monoplanes . . .

Ready For
IMMEDIATE DELIVERY

We have new Broughams, and one Brougham Demonstrator in excellent condition—attractive discount offered.

These planes are equipped with Wright Whirlwind Motors and have hand starters.

We also have one Ryan M-2 with Hisso Motor in excellent condition.

We will gladly give a demonstration to parties interested in the purchase of any of these planes.

VON HOFFMANN AIRCRAFT CO.
(Distributors of Ryan Monoplanes)
Lambert-St. Louis Flying Field
Anglum, Mo.

"For the Central Northwest"

Ryan Sales and Service

Allow us to demonstrate the new Ryan models for you in the air. Telephone, wire or write and a Ryan will be placed at your disposal.

NORTHWEST RYAN AIRCRAFT CO.

M. A. Warner, M. M. Hurd Hangar
United States Air Mail Hangar
Wold-Chamberlain Field, Minneapolis
Office: 1040 Builders Exchange, Minneapolis
Telephone: Main 9190

Good & Foster

Agents for

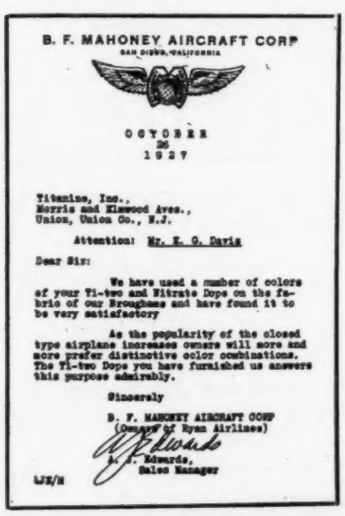
Ryan Airplanes

Aero Service
Cross Country Trips
FLYING INSTRUCTION
Airplanes and Parts
Airplane and Engine Rebuilding

Hangar No. 1
Love Field, Dallas, Texas

"We go any place there is air".

Ryan Brougham finished with Ti-Two Dope



B. F. MAHONEY AIRCRAFT CORP
SAN DIEGO, CALIFORNIA

OCTOBER 26 1927

Titanine, Inc.,
Morris and Elmwood Aves.,
Union, Union Co., N.J.

Attention: Mr. E. O. Davis

Dear Sir:

We have used a number of colors of your Ti-two and Nitrate Dope on the fabric of our Broughams and have found it to be very satisfactory

As the popularity of the closed type airplane increases owners will more and more prefer distinctive color combinations. The Ti-two Dope you have furnished us answers this purpose admirably.

Sincerely

B. F. MAHONEY AIRCRAFT CORP
(Owners of Ryan Airlines)
W. J. Edwards,
Sales Manager

WJE/N

now available in glossy or lacquer finish

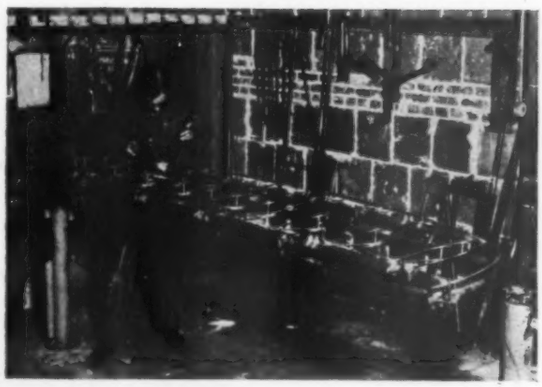
Ti-Two dope and Titanine clear and pigmented dopes are used by the leading manufacturers of aircraft.

TITANINE, Inc.
UNION, UNION COUNTY, N. J.
Contractors to U. S. Government

SUMMERILL
Seamless Steel Tubing

is used throughout the fuselage, landing carriage and tail structure of the

RYAN BROUGHAM



Welding the tail structure for the Ryan Brougham in the factory of the B. F. Mahoney Aircraft Corporation. Specification 1025 steel tubing supplied by the Summerill Tubing Company.

SUMMERILL
TUBING COMPANY
BRIDGEPORT, PENNSYLVANIA

Specialists in Aircraft Tubing

Manufacturers for 25 years.

Furnished to Specifications in

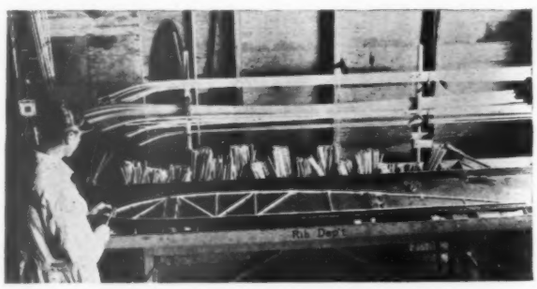
STRAIGHT CARBON
NICKEL STEEL
CHROME MOLYBDENUM

"The Secret of Airplane Efficiency . . .

. . . lies in the rib straight grain Spruce, J. V. G. Posey & Co., Portland, Oregon, furnished. The best possible material obtainable is used throughout the Ryan Brougham manufactured by the B. F. Mahoney Aircraft Corporation."

Quotation from a statement made by the B. F. Mahoney Aircraft Corporation.

Spruce supplied by Posey was used in the most famous of all Ryan planes, "The Spirit of St. Louis".



Building the wing ribs of a Ryan Brougham from spruce supplied by J. V. G. Posey and Company.

AIRPLANE SPRUCE

Rough Green, Rough Air Dried, Kiln Dried Rough, or Finished to Sizes.

J. V. G. POSEY & COMPANY
Public Service Building
Portland, Oregon

SPRUCE SPECIALISTS FOR OVER 20 YEARS

We, Too, Are Expanding!

The expansion of the B. F. Mahoney Aircraft Corporation has its part in our own expansion. Their increased purchases have helped make new facilities necessary. We appreciate their business and congratulate them on their success.

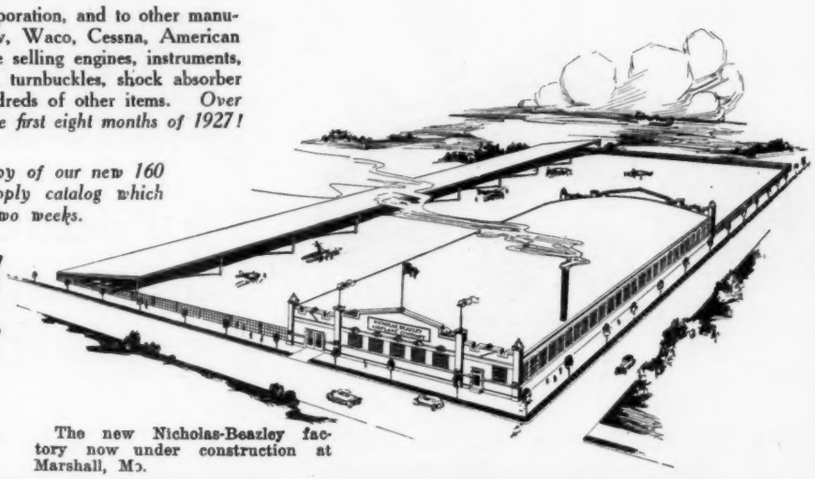
To the B. F. Mahoney Aircraft Corporation, and to other manufacturers, including Travel Air, Swallow, Waco, Cessna, American Eagle, Pitcairn and many others, we are selling engines, instruments, safety belts, steel bolts and nuts, fabric, turnbuckles, shock absorber cord, magnetos, airplane spruce and hundreds of other items. *Over $1,000,000.00 worth of supplies alone the first eight months of 1927!*

Write now for a FREE copy of our new 160 page illustrated aeronautical supply catalog which will be off the press in about two weeks.

NICHOLAS-BEAZLEY AIRPLANE CO., INC.

"We Will Be Here Tomorrow"

264 North St. Marshall, Mo.



The new Nicholas-Beazley factory now under construction at Marshall, Mo.

IN EVERY BROUGHAM

- there is a "fineness inherent", a "personality", unusual in production airplanes...

Confidence in a plane is psychological. One of the first impressions you will have while riding in the Brougham is a sense of quietness — smoothness — comfort. A thick lining of BALSAM WOOL between fabric and upholstering minimizing engine and propeller noises contributes greatly to this inherent feeling of security.

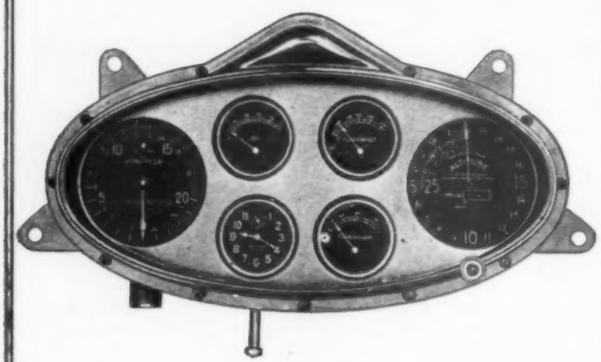
"Balsam Wool"
The efficient insulation against heat, cold and sound.

Wood Conversion Company

INSULATING AND SOUND DEADENING MATERIAL

CLOQUET, MINNESOTA

The Elgin Unit Control Board



THE ELGIN type TA unit control board contains the Elgin chronometric tachometer, Army type C altimeter, oil pressure gage, oil temperature gage, Elgin thirty hour clock, and ammeter for air-cooled engines. This type of board is also furnished for water-cooled engines with the ammeter replaced by a water temperature gage. The weight of the board, with five feet of capillary tubing for the oil temperature gage is only five pounds and ten ounces.

The board is directly lighted with a two-candlepower Mazda lamp, for use at dusk, or for the time that a plane is being warmed up on a brightly lighted field, and other times when it is not dark enough for the luminous substance on the instruments to give a good reading.

This type has recently been installed on a Mahoney Brougham with very satisfactory results, and is now being used on several of the leading commercial planes. The Elgin National Watch Company also makes two different indirectly lighted unit control boards. The entire bevel of the board is chromium plated to insure uniform luminosity of the board.

ELGIN NATIONAL WATCH COMPANY
35 East Wacker Drive, Chicago, Ill.
Factories, Elgin, Illinois

An aero-cloth that exceeds the most rigid government specifications . . .

DARTMOUTH-TEX

THE quality of *Dartmouth-Tex* aero-cloth and tapes has been proven to exceed the most rigid government specifications. This is one of the factors which has made it the leading grade "A" aero-cloth in America. *Dartmouth-Tex* has played an important part in military and commercial aviation since the days before the World War.

Dartmouth-Tex is a mercerized cotton, full count fabric, 36 inches wide, for *wings, tail surfaces, fuselage coverings.* It can be obtained on convenient rolls, which insures against creasing and wrinkling. It is supplied either processed or unprocessed.

Durable tapes of all kinds—surface tapes, pinks, (scallops)—in any size required are ready for immediate delivery. Write for samples and quotations.

Sole Distributor

W. HARRIS THURSTON
THURSTON CUTTING CORPORATION
116-118 FRANKLIN STREET
NEW YORK CITY

THE LEADING GRADE "A" AERO CLOTH

Read this letter from
B. F. Mahoney Aircraft Corp.

Mr. Andrew C. Campbell,
42 State Street,
Waterbury, Connecticut.

Attention: Mr. Campbell.

Dear Mr Campbell:

We found it impossible to go into quantity production on our monoplane until we had installed several Campbell-Nibbling Machines. Every fitting used on our newest Brougham was made from sheet steel on one of your machines.

We have estimated that a man with a Nibbling Machine turns out approximately six times as much work as he would under the old method.

Sincerely,

B. F. MAHONEY AIRCRAFT CORP.,
(Owners of Ryan Airlines)
A. J. Edwards, Sales Manager.

CAMPBELL
NIBBLING MACHINE

ANDREW C. CAMPBELL, Inc., Bridgeport, Connecticut

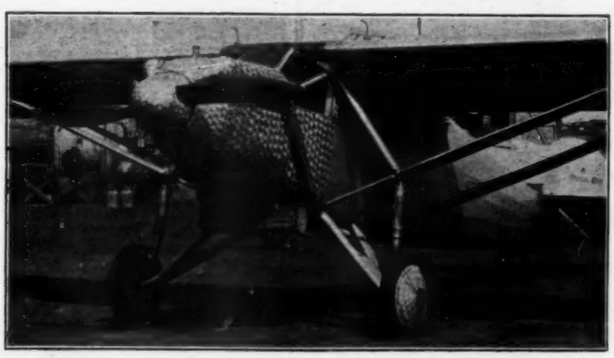
This No. 1-A Machine has a 12-inch throat and handles material up to 3-16″ thick, with a cutting speed of approximately 30 inches per minute.

Campbell Nibbling Machines are made in the following sizes:

Number	Thickness Capacity	Depth of Throat
0	3-32″	8″
1	3-16″	6″
1-A	3-16″	12″
1-B	3-16″	24″
2	3-8″	12″
2-B	3-8″	30″

Write for Full Information and Prices

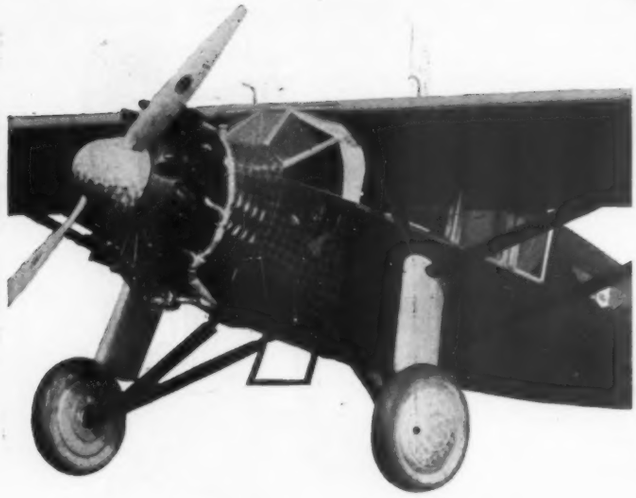
TRADE HAMILTON MARK
PROPELLERS



HAMILTON PROPELLERS SELECTED FOR NEW RYAN BROUGHAM

The confidence shown by the B. F. Mahoney Aircraft Corporation, manufacturers of the Ryan Brougham, in selecting Hamilton Propellers, again bears out what other aircraft manufacturers have so often said -- that "Hamilton Propellers are the finest made".
Hamilton Propellers are designed and constructed to give the greatest efficiency under all flying conditions.

HAMILTON AERO MFG. CO.
60 Keefe Ave. *Milwaukee, Wis.*



Service Steel

Seamless Tubing

is called for by the engineers' specifications on the Ryan

B-1

Seamless steel tubing for aircraft purposes, in all grades, can be supplied from both warehouse and mill. Immediate shipments made in any quantity.

SERVICE STEEL CO.

1435 *Franklin Street,* *Detroit, Mich.*

Equipped with

Gruss Aero Strut

Shock Absorbers

Ryan Brougham

Always in the AIR *Yet on the* GROUND

A 10 inch compressed air cushioned range of deflection absorbs all landing shock and also eliminates all jar when taxiing.

A positive hydraulic check governing recoil. These features make all landing soft and short and insure protection to all parts of the ship.

Safety, Economy and Efficiency

Manufactured by

Gruss Air Spring Co. *of* America

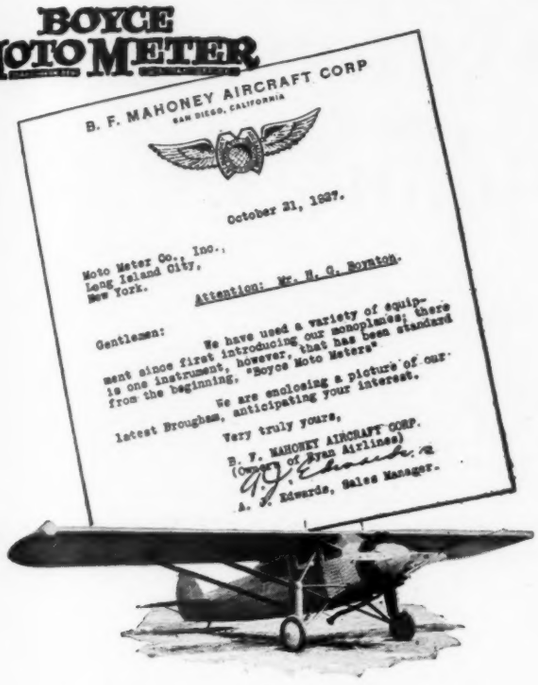
(Patentees)

San Francisco, ***California***

Full information upon request

Manufacturers of the World Famous Gruss Air Spring for Automotive Equipment, Busses, Trucks and Pleasure Cars.

BOYCE MOTO METER


B. F. MAHONEY AIRCRAFT CORP
SAN DIEGO, CALIFORNIA
October 21, 1927.
Moto Meter Co., Inc.,
Long Island City,
New York.
Attention: Mr. H. G. Boynton.
Gentlemen:
We have used a variety of equipment since first introducing our monoplanes; there is one instrument, however, that has been standard from the beginning, "Boyce Moto Meters"
We are enclosing a picture of our latest Broughan, anticipating your interest.
Very truly yours,
B. F. MAHONEY AIRCRAFT CORP.
A. J. Edwards, Sales Manager.

The MOTO METER CO., Inc.
4 Wilbur Avenue, Long Island City, N. Y.
Chicago Office: 820 Tower Court

J. W. WOOD

Shock Absorber Cord

is standard equipment on the famous

Mahoney Monoplanes

The leading commercial and military planes of today are equipped with J. W. Wood Shock Absorber Cord. The Wood Elastic Web Company were the pioneer manufacturers of shock cord in the United States and were the principal producers of this product for the U. S. and Canadian governments during the World War. The Stoughton (Mass.) factory is fully equipped to meet the largest requirements and any experimental tests.

J. W. Wood Elastic Web Co.
Stoughton, Mass., U. S. A.
New York Office: 45 E. 17th St.
Canada: 32 St. Peter St., Montreal

IDEAL HOSE CLAMPS

have been successfully used on all trans oceanic flights because they are absolutely dependable.

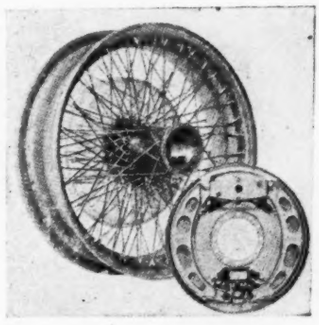
Do you carry them?

IDEAL CLAMP MFG. CO.
Incorporated

200 Bradford St., Brooklyn, N. Y.

For Perfect Control

Ultimate in Strength



SAUZEDDE
WHEEL AND BRAKE UNITS
used by Mahoney and other
LEADING BUILDERS

Prices and Specifications Furnished on Request

SAUZEDDE CORPORATION
DETROIT, MICH., U.S.A.

Rules *and* Regulations *of the* London Aeroplane Club

IN ORDER that those persons desirous of forming flying clubs, in this country may better understand the details involved, a printed reproduction of the circular, application and by-laws of the London Aeroplane Club, is given below.

THE LONDON AEROPLANE CLUB

The Royal Aero Club has been selected by the Air Council to carry out in the London District the Council's Scheme for Light Aeroplane Clubs. To meet the situation, the Royal Aero Club has formed the London Aeroplane Club.

OBJECTS OF THE CLUB

1. The Club is formed with the object of bringing together as Members of the Club persons interested in flying, and for the purpose of providing and maintaining aeroplanes for the use and instruction of Members of the Club. Membership of the Club is open to British Subjects only.

CONSTITUTION

2. The London Aeroplane Club is the property of London Aero Club Limited, hereinafter called the Company. All entrance fees (if any), subscriptions and other payments by Members, shall become the property of the Company, and the Company shall be solely responsible for the provision of the Aerodrome, Equipment and Personnel, and shall have entire control of all matters of finance in connection with the London Aeroplane Club.

3. *The only liability of Members is for payment of the entrance fees (if any), subscriptions and charges authorised by the Rules of the Club.*

4. The London Aeroplane Club shall be governed by a Committee nominated by the Company.

5. A Member, on paying his entrance fee (if any) and subscription, thereby agrees to be governed by the Rules of the London Aeroplane Club for the time being in force, and by any Rules which may hereafter be issued by the Committee.

MEMBERSHIP

6. The Club shall consist of Ordinary and Associate Members, and shall be open to both sexes.

ENTRANCE FEE AND SUBSCRIPTIONS

7. A. *Ordinary Members.* Entrance Fee, £3 3s.; Subscription, £3 3s. per annum. For Members who desire to take instruction in flying, and those who, being qualified, wish to hire the aeroplanes provided by the Club. The Ordinary Membership subscription for Members of the Royal Aero Club shall be £2 2s. per annum.

B. *Associate Members.* Subscription, £1 1s. per annum. For Members who desire to support and encourage Aviation by attendance at the Aerodrome. Associate Members shall be entitled to take passenger-flights when aeroplanes are available, at the charges set out below.

8. Entrance fees (if any) and subscriptions shall be payable on election, and subsequent subscriptions on 1st July in each year. In the case of Members joining on or after 1st June in any year, the subscription then payable by them shall cover the period to 30th June in the following year.

RESIGNATIONS

9. Any Member desiring to resign his/her Membership of the Club shall give notice in writing thereof to the Secretary on or before 30th June in any year, failing which he/she shall be liable to pay his/her subscription for the following year.

SUSPENSION AND EXPULSION

10. If any Member shall be charged with conduct which, in the opinion of the Committee, renders it desirable that he/she should cease to be a Member of the Club, he/she shall be invited to attend a meeting of the Committee at which any enquiry into such charge shall be held. If after enquiry the Committee find the charge to be sustained, the Member charged may be cautioned, suspended, required to resign his/her Membership of the Club, or expelled, as the Committee may think fit.

CHARGES FOR FLYING

11. *Two-Seater Dual-Control.*—The charge will be £1 10s. per flying hour, which charge shall include the cost of instruction, oil and petro, damage to aeroplane and third-party insurance.

Single-Seater.—The charge will be £1 per flying hour, which charge shall include the cost of oil and petrol, damage to aeroplane and third-party insurance.

12. The minimum time for which aeroplanes may be hired will be half an hour.

13. Before any flight is made, all charges must be paid to the official appointed by the Committee to receive payments for flights.

LIABILITY

14. The Company accept responsibility for damage to their aeroplanes, and legal liability for damage to third parties, except where such damage to aeroplanes or to third parties is caused wholly, or in part, by a wilful breach of the Rules of the Club.

15. The Company does not accept any liability for any injury or damage sustained by Members of the Club hiring heroplanes for solo, passenger or instructional flights; and before any Member shall be entitled to hire an aeroplane for the purpose of flying he/she will be required to sign an understanding exempting the Company and its employees from all liability for injuries or damage sustained by the Member, himself or herself. In the case of Members under the age of 21, such undertaking must in addition be signed by the parent or guardian of such Member.

MEMBERSHIP BADGES

16. Upon payment of the entrance fee (if any) and subscription for the year, and after such undertaking has been duly signed (and if necessary countersigned as above), a Membership badge will be issued to each Member; such badges will be distinctive of the class to which each Member belongs, whether Ordinary or Associate, and will be valid for one year.

Before any flight is made, a Member's badge must be produced to the Officials appointed by the Committee to take charge of flying.

REGULATIONS FOR FLYING

17. Members shall make themselves acquainted with all Regulations from time to time issued by the Committee with regard to flying instruction and hiring of aeroplanes, and shall be responsible for the due observance thereto.

18. None but Ordinary Members shall be entitled to receive flying instruction, and/or to hire aeroplanes for solo flying. Aeroplanes for solo flying shall only be hired to such Ordinary Members as hold the Air Ministry "A" or "B" License.

19. Subject to the prior claims of instructional and solo flying, Associate Members will be permitted to hire aeroplanes for passenger flying at the rate of £1 10s. per flying hour.

20. Subject to the Regulations from time to time issued or to be issued by the Committee, instructional flying shall take priority over solo flying, and solo flying over passenger flights.

21. The availability of aeroplanes for flying shall be subject to necessary overhauls and repairs.

22. The control of flying, and all matters affecting the working of the Aerodrome (for instance, the practicability of weather conditions, the fitness of aeroplanes and engines for use, and the settlement of competing claims of Members for the hire of aeroplanes), shall be regulated by the Committee, or by an official or officials appointed by them, in order to ensure the safest and fairest possible conditions of working in the best interests of the Members of the Club.

23. The Committee may alter the Regulations and add thereto, as may from time to time be considered advisable.

24. The interpretation of these regulations, and of any hereafter issued, shall rest entirely with the Committee.

GENERAL

25. The activities of the Club will be confined to the Aerodrome selected by the Committee. The Secretary for the time being will be the Secretary of the Royal Aero Club, and the secretarial duties will be carried out at the Royal Aero Club premises, 3, Clifford Street, London, W. 1, where all enquiries should be addressed. Membership of the London Aeroplane Club alone does not carry with it the privilege of using the Royal Aero Club premises.

FORM OF APPLICATION FOR MEMBERSHIP

THE SECRETARY,
LONDON AEROPLANE CLUB,
3 CLIFFORD STREET,
LONDON, W. 1.

Having read your circular headed "London Aeroplane Club," I request to be enrolled as Member of the London Aeroplane Club, and I
Associate
Ordinary
enclose remittance £6 6s. being the Entrance Fee £3 3s., & Subscription £3 3s. for the year ending 30th June 192 .
£1 1s. being the Associate Subscription

I am a British Subject, and am 21 years of age.
under
over

I agree to be governed by the Rules for the time being in force, and any which may hereafter be issued.

Signature .....
Name in full .....
Address .....
.....
Date .....

HIRING OF AEROPLANES

The hiring of all aeroplanes is on the understanding that the London Aero Club Limited accept no responsibility for any damage or injury

whatsoever that may occur to any Member of the London Aeroplane Club while flying in aeroplanes, the property of the Company.

Signed .....

Date .....

If under 21, the applicant must in addition obtain the signature of his/her parent or guardian below.

.....

Parent.
Guardian.

Date .....

BYE-LAWS

The fees for the hire of aeroplanes must be paid to the Club Official before any flight is made.

No member may hire an aeroplane for more than half an hour if it is required by other Members. Further periods will be allowed in rotation if time permits.

Members hiring aeroplanes for solo flights, except in the case of a Member under flying instruction, must hold the Air Ministry Piot's License.

Members hiring aeroplanes for solo flying must confine their flights to within three miles of the aerodrome.

Members hiring aeroplanes for solo flying may be held responsible for any expense of transporting the aeroplanes back to the aerodrome in the case of any landing, forced or voluntary, outside the three-mile limit.

Members booking times in advance must be on the aerodrome ten minutes prior to the time booked.

Members booking times in advance and not turning up will be charged the minimum time of half an hour, unless notice is given at least one hour before the time booked cancelling the booking.

Members holding Pilots' Licences and wishing to fly solo must first have a period of dual control with the Pilot Instructor, and it is left entirely to the Pilot Instructor to decide whether such Members shall be allowed to fly solo.

Members under flying instruction will require to have at least eight hours dual control before being allowed to fly solo, and then only with the sanction of the Pilot Instructor.

Members under instruction must undergo a Medical Examination. This examination can be conducted by the Member's usual medical attendant, whose report must be made on the form prescribed by the Air Ministry. Medical Forms can be obtained at the Club.

The question as to the suitability of weather for flying is left entirely to the Pilot Instructor.

Members must at all times conform to the Air Navigation Regulations and such local flying regulations as are in force.

No Member may take up passengers on a Club aeroplane unless specially authorized by the Committee to do so. Passengers must be Members of the Club. Applications to carry passengers will only be considered by the Committee after the completion of a minimum of fifty hours flying.

All complaints must be made in writing to the Secretary and not to the Pilot Instructor.

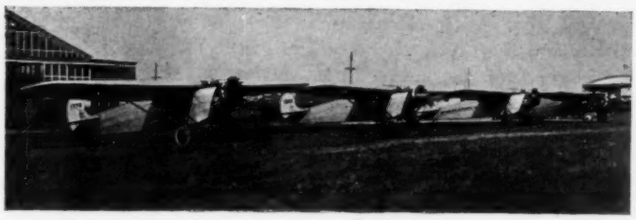
Production of Fokker Airplanes For Commercial Use Increasing

PRODUCTION OF Fokker airplanes, for commercial use, at the Atlantic Aircraft Corp., Hasbrouck Heights, N. J. has been increasing of late according to officials of that company. There have been many purchasers of Fokker Universals desiring special equipment. The Plane Speaker Corp. recently purchased a special Universal fitting with an exceptionally large wing to carry the additional load of the plane speaking apparatus. Other Universals were recently purchased by the Pacific Air Transport, Inc., by the Tela Railroad Co., a subsidiary of the United Fruit Co. to operate in Honduras, by the Reynolds Airways, Inc. and by William H. Dunning, Jr. of Fort Worth, Tex. The plane purchased by Mr. Dunning was fitted with a Pratt and Whitney "Wasp" engine giving it a high speed of 140 m.p.h. and a climb of 1250 ft. in the first minute.

Many Installation Changes Made

There have been many interesting changes in the installations on the latest models of the Fokker Universals. The planes are of standard Fokker construction with welded steel fuselage and veneer covered semi-cantilever wings built in one piece. The pilot's cockpit has been redesigned to accommodate another person without increasing the width of the fuselage. Entrance is made from the passenger's cabin and after the pilot is seated another person can enter and sit at his right. A part of the seat folds away when using this entrance. The controls are set sufficiently over to one side to be comfortable for the pilot to operate and yet have the second man conveniently reach the rudder pedals and stick for purposes of instruction or to relieve the pilot. The control shaft and aileron cables are so arranged that the stick can be moved to a middle position and the pilot sit there if it is not desired to use the additional seat arrangement. As the fuselage is not widened, vision is the same as before. The cockpit, if desired, can be provided with a glass top with sliding windows at the sides.

The cowling has been so designed as to form a perfect streamline in straight lines from the fuselage between the



Line up of Fokker Universals ready to be delivered to purchasers.

cylinders and over the front of the engine, thus allowing ready interchangeability of propellers.

The exhaust manifold is now partly streamlined into the cowling, lying practically entirely within the cowling line, and yet sufficiently cooled on both sides of the pipe. Owing to the additional curvature of the side of the fuselage, due to the cowling, the elevator control lever and the pulleys, which were previously outside the fuselage, are now inside. According to the manufacturer the result has been an increase in speed of, as far as can be judged at the present time, about eight m.p.h. The Aero Corp. of California, distributors for Fokker Universals for that state and Arizona recently reported that the Universal purchased by the Pacific Air Transport, Inc. has been on the Los Angeles-Seattle route since last June and has given very satisfactory service.

To Open Air Mail Bids Dec. 28

POSTMASTER GENERAL New has announced that on Dec. 28, 1927, bids will be opened at the Post Office Department for the operation of a contract air mail route between Salt Lake City, Utah, and Great Falls, Mont., via Pocatello, Idaho, Butte and Helena, Mont. The distance between the two cities is 476 mi. and flying will be done in daylight. The proposed schedule is as follows: (Mountain Time)

Lv. Salt Lake City	10:10 A.M.	Ar. Pocatello	11:45 A.M.
Lv. Pocatello	11:50 A.M.	Ar. Butte	2:10 P.M.
Lv. Butte	2:50 P.M.	Ar. Helena	2:45 P.M.
Lv. Helena	2:55 P.M.	Ar. Great Falls	3:35 P.M.
Lv. Great Falls	9:50 A.M.	Ar. Helena	10:30 A.M.
Lv. Helena	10:35 A.M.	Ar. Butte	11:00 A.M.
Lv. Butte	11:05 A.M.	Ar. Pocatello	1:20 P.M.
Lv. Pocatello	1:25 P.M.	Ar. Salt Lake City	2:50 P.M.

Splitdorfs on Winning Planes

ACCORDING TO E. B. Nowosielski, chief engineer of the Splitdorf Bethlehem Electrical Co., Splitdorf VA magnetos were used on the planes that won the following races at the recent National Air Races: Liberty Engine Builders' Trophy Race, won by Lieut. H. A. Johnson in a Curtiss Falcon, average speed 170 m.p.h. Second, Lieut. G. A. McHenry in a Curtiss Falcon, average speed 164 m.p.h. Free For All Pursuit Ship Race won by Lieut. Eugene Batten in a Curtiss Hawk, average speed 201 m.p.h. Second, Lieut. A. J. Lyon in a Curtiss Hawk, average speed 189 m.p.h.

Large Transport Plane Under Construction at Boeing Plant

THERE IS now under construction at the factory of the Boeing Airplane Co., at Seattle, Wash., what will be one of the largest commercial air transport planes ever built in this country. It is a closed cabin biplane, powered with three Pratt & Whitney Wasp engines and accommodating twelve passengers in addition to carrying 1,500 lb. of mail, express or baggage. It is calculated to have a high speed of 128 m.p.h. and a cruising speed of 100 m.p.h. Sufficient fuel will be carried for six hours flying, giving a range of approximately 600 mi. The plane has been designed to have a creditable performance of two engines, having a high speed of 107 m.p.h, and a climb of 370 f.p.m.

The wings of the Boeing No. 80 commercial airplane will be of conventional wood and wire construction, having box beams swaged wire drag bracings with interplane bracing of duralumin struts and streamline wire. The upper wing will have a slightly larger span, being 80 ft. from tip to tip, and the lower wing 65 ft. 8 in.

A Well Upholstered Cabin

The fuselage will also be of conventional design of steel and duralumin tubings with steel tie rods for diagonal bracing. Similar to the wings it will be covered with fabric. The cabin for the passengers will be well upholstered with a single row of seats on the left side and a double row on the right. The side of the cabin will be unobstructed by the fuselage structure, and will have large windows of safety glass that can be easily opened. The cabin is to be insulated against the noise of the engines and extreme temperatures. In addition, a forced ventilation and heating system is provided. At the rear of the cabin is a small washroom. The passengers compartment is approximately 7 ft. high, 5 ft. wide and 14 ft. long.

Two baggage compartments are provided, both 60. cu ft. capacity; one is just forward of the main cabin and the other just aft. The empennage is of steel and duralumin tubing covered with fabric. Both the stabilizer and vertical fin are adjustable in flight to compensate for differences in loading or to assist in the control of the plane in the event of failure of one of the wing engines. The power plant of three Wasp engines will be arranged with two outboard engines and one engine at the nose. Each engine will be equipped with an electric inertia starter and in addition will have a hand crank in the event of failure of the electrical unit. The starters and all the engine controls are operated from the pilot's cockpit. The oil tanks and all other installations are arranged on the engine so that the entire unit may be quickly removed and replaced by a similar unit. Each engine is provided with a temperature control device operated from the cockpit.

Fuel Tanks in Wings

The fuel supply is to be carried in two tanks of 170 gal. each in the wings. It is planned that in case of the failure of an engine pump, the gasoline will be fed by gravity, (the nose engine will not feed by gravity in a climb, as will the outboard engines.) The fuel supply is planned to give a cruising range of six hours at 100 m.p.h.

The cockpit is to be arranged at single control, the seat opposite the pilot being for a mechanic. The cockpit is arranged so that it can be readily covered over, making it into a closed cabin. This transport is to be provided with oleo shock absorbers, wheel brakes, wheel tail skid and complete night flying equipment including two parachute fliers.

The following specifications and characteristics have been calculated and submitted to AVIATION by the manufacturers:

Total weight, including 3,700 lb. per pay load	13,770 lb.
Wing area	1,220 sq. ft.
Span, upper wing	80 ft.
Span, lower wing	65 ft. 8 in.
Chord, upper wing	10 ft.
Chord, lower wing	7 ft.
Length, overall	56 ft.
Height, (with front propeller turning)	14 ft. 8 in.
Height, (with all propellers horizontal)	12 ft. 8 in.
Propellers—Standard Steel adjustable Dural blades.	
Diameter	10 ft.
Wing loading—full load	11.3 lb. per sq. ft.
Power loading—full load	10.8 lb. per hp.
Normal pay load per hp.	2.9
Performance with full load three engines	
High Speed, sea level	128 m.p.h.
High speed, 10,000 ft.	118 m.p.h.
Landing speed at sea level	53 m.p.h.
Climb to 5,000 ft.	10 min.
Climb to 10,000 ft.	17 min.
Rate of climb at ground	980 f.p.m.
Climbing speed at ground	84 m.p.h.
Service ceiling	14,400 ft.
Speed at sea level, all engines throttled to 1700	120 m.p.h.
Speed at sea level, all engines throttled to 1500	100 m.p.h.
Performance, with full load two engines.	
High speed at ground	107 m.p.h.
Service ceiling	7,000 ft.
Rate of climb at ground	370 f.p.m.
Climbing speed at ground	75 m.p.h.

Keep Date by Air

Left to right Frank Cummings, Jr., Jack Lass and R. T. Robinson, Jr., in front of the Mahoney plane which Lass piloted from San Diego to Colorado Springs so that his two passengers might keep an important business meeting. Part of the rush journey was made over the Rockies.

Air Mail Pilot Sets Record

PILOT C. K. Vance of the Boeing Air Transport, Inc. claims an air mail speed record for his trip over the San Francisco-Chicago run. It was recently announced that he flew from Concord Field to Reno in 1 hr. 29 min. with a stop at Sacramento. Flying at an altitude close to 11,000 ft. he made the 99 mi. from Sacramento to Reno in 55 min., an average speed of 108 m.p.h. He used a Boeing Mail Plane powered with a Pratt and Whitney "Wasp" engine.

Plan International Air Show

IT HAS been reported that plans are now under way for an international aeronautics exhibition to be held in Berlin, Germany from March 23, 1928 to April 11, 1928. It comprises a joint showing of commercial and sport planes though no mention is made in the report regarding the participation of military or naval planes, either by manufacturer's exhibits or in exhibition or competitive flights.

There will also be booths at the exhibition for manufacturers of airplane motors and accessories of all kinds. Everything pertaining to aeronautics will be on exhibit, including raw materials, semi-manufactured goods and engine fuels. Aeronautics schools and publishers of aeronautical magazines will be represented.

In the partitioning of the exhibition space, the authorities state that absolutely no partiality will be shown, and that foreign exhibitors should be allowed to exhibit on the same basis with the German concerns. The fair will also include all kinds of exhibition flying, and competitive flights are being arranged. Complete information regarding the participation in the fair may be obtained from Ausstellungs-Messe- und Fremdenverkehr samt der Stadt Berlin.

Curtiss Receives Plane Order

ACCORDING TO a recent report the War Department has ordered 35 observation planes of the O-11 type from the Curtiss Aeroplane and Motor Co. of Garden City, Long Island, N. Y. The O-11 planes which were developed from the Curtiss O-1, are for use with National Guard units. It is stated that the Curtiss Company is to start delivery about the middle of December, 1927, at the rate of about three planes a week.

In addition the War Department made awards of the contest on a special service observation plane, winners of which were announced recently. Contracts are now being negotiated for one of each of the type of planes designated as winners as follows: one model from the Keystone Aircraft Corp., Bristol, Pa.; one from the Douglas Airplane Co., Santa Monica, Calif., and one from the Curtiss Aeroplane and Motor Corp., Garden City, N. Y. Upon receipt of these models further study will be made as to the adaptability of this type of plane, known as a four-purpose plane, for National Guard and organized reserve flying in the United States.

Bellanca Moves Factory

IT WAS recently reported that the Bellanca Aircraft Corp. of America now located at Arlington, Staten Island, N. Y., is to move its factory to New Castle, Del. A factory site has been chosen adjacent to a tract of 350 acres suitable for a landing field, with a frontage on the Delaware River of 1,100 ft. The Bellanca Company is headed by Guiseppe M. Bellanca, builder of the trans-Atlantic plane, "Columbia".

It is stated that the organization is backed by the du Pont family though it is in no way connected with the E. I. du Pont de Nemours Co. It is interesting to note that three members of the du Pont family are pilots, Francis V. du Pont, Henry B. du Pont, and A. Felix du Pont, Jr. A Felix du Pont is a cadet in the Army Air Corps at Brooks Field, Tex.

The Bellanca Company is now building six planes very similar to the Columbia and it is said that one of these is to be used for a long distance flight.

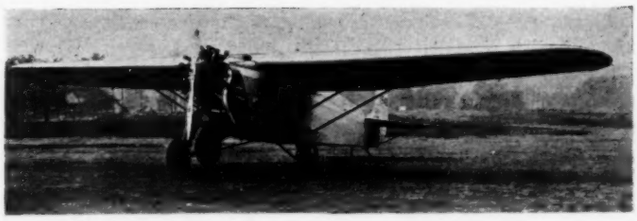
Keystone Gets Bomber Order

A REPORT from the War Department states that orders for the first production of bombardment planes designed for re-equipment of the bombardment units of the Army Air Corps has been awarded to the Keystone Aircraft Co. of Bristol, Pa. The order is for 25 light bombardment planes of the type LB-5A. They are designed to carry 2000 lb. of bombs at an average speed of 100 m.p.h. with a cruising range of about six hours. Two machine guns will be mounted in the forward cockpit, two in the rear cockpit and one tunnel gun is designed to shoot through the floor. The power is furnished by two Liberty engines, while the fuselage will provide room for a pilot, mechanic, machine gunner and a bombardier.

These bombardment planes are to be assigned to the bombardment group at Langley Field, Norfolk, Va. They will release from Langley Field planes now in use there and which are in turn scheduled for allocation to the Air Corps Advanced Flying School, Kelly Field, Texas, for the training of those students specializing in bombardment.

Fokker Plane Has Third Wheel

THE TELA Railroad Co., a subsidiary of the United Fruit Co., recently purchased a Fokker Universal for use on an airline from Tegucigaloa, Honduras to the north coast of Honduras. As the country in Honduras is rough and lacks



Fokker Universal fitted with a third wheel.

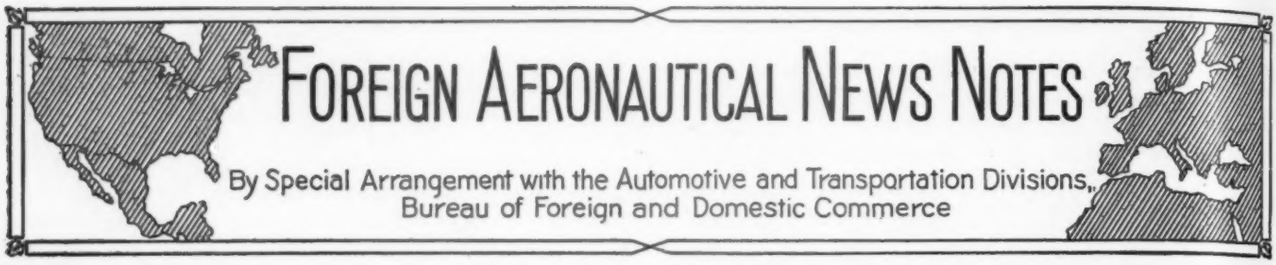
intermediate landing fields, a third wheel was added to the plane. Mr. Morgan, pilot of the new airline tested the plane and especially the landing gear for some time at the Teterboro Airport, N. J. before taking the plane to New Orleans for shipment to Honduras.

Fokker Plane Shipped South

THE FIRST of two Fokker Trimotors, powered with three Wright Whirlwind engines, for the Pan American Airways, Inc., New York City, was recently delivered for use on the air mail and passenger route between Key West, Fla. and Havana, Cuba. A. A. Priester, who was operations manager of the Philadelphia Rapid Transit Air Service, Inc. during its operation of the Philadelphia-Washington-Norfolk air mail run has been placed in complete charge of the new line.

Fields Airways Formed

THE FIELDS Airways of New York City, has been organized to offer a complete service in the many different phases of commercial aviation. The company arranges for passenger flights, sightseeing tours, aerial surveys and aerial photography. The company is also offering a development service in connection with the establishment of airports and acts as broker for the different types of commercial aircraft.


FOREIGN AERONAUTICAL NEWS NOTES
By Special Arrangement with the Automotive and Transportation Divisions,
Bureau of Foreign and Domestic Commerce

Le Bourget Airport

Le Bourget, the principal airport in France, is owned and maintained by the government, and is located near Paris. The field has excellent turf surface without gradient and natural drainage. There are no runways but there is a cement anchorage platform, where planes are loaded and unloaded. The only obstructions are the two groups of buildings; that on the eastern edge for civil air services and that on the western for military units.

An electric winking beacon, on a high tower, at the northeast corner emits the Morse signal "N". A revolving flashing electric beacon on a nearby tower has 8 Neon 8-meter tubes connected in two series of 4 tubes. A dioptical landing projector permits landing in the north-south or south-north direction, and another will be provided to enable landings in two other directions. A luminous Greek cross on the office building emits green or red lights, according to whether an approaching plane will be permitted to land or not. All obstacles and buoys marking the boundaries have red lights.

There are 17 substantial hangars, heated with hot air, lighted with electricity, and with doors electrically operated.

Private companies employ some 400 persons and do practically all of their repair work in their shops and hangars. Ample quantities of high grade fuel and oil are stored underground. Hose connections and fire extinguishers are in the hangars. A medical center, completely equipped for emergency for medical and surgical work is housed in a special building, which also has complete apparatus for periodic pilots' examinations.

A branch customhouse, branch ticket offices, a restaurant, and some other accommodations are at the airport.

The airport is served adequately by telephone, telegraph, radio, and ground transportation facilities.

A special building houses a well-arranged weather map and meteorological data display board and information for all of Europe is shown by symbols in accordance with the International Air Navigation Treaty, 1919. Reports are received from some centers every hour.

Air Mail to Link France and South America

The French Government has approved an addition to the 10-year contract between the State and the Compagnie Generale d'Entreprises Aeronautiques. The agreement accords the company the postal concession for air mail between France and South America, the government also agreeing to subsidize the company in developing the air service between France, Dakar, Rio de Janeiro, and Buenos Aires. The Compagnie Generale Aeronautique has concluded agreements with the South American countries interested in the development of the project. The new line will be the longest combined air and water route in the world, covering 7,710 miles. It is expected that the total time between Paris and Buenos Aires will be from seven to seven and a half days. The trans-Atlantic trip is expected to be accomplished in four stages, as follows: From Dakar to Cape Verde Islands, by airplane; Cape Verde Islands to Fernandi de Noronha, by fast boat; Noronha to Pernambuco, by seaplane; Pernambuco to Rio de Janeiro, to Buenos Aires, by airplane. The service will at first consist primarily of the carrying of mails and merchandise, and will not be available to passengers without special authorization from the French minister in charge of air navigation.

Airport at Santiago de Cuba

The Secretary of Agriculture, Commerce and Labor, in Havana, has ceded a parcel of land in the San Juan River valley, situated to the south of San Juan Hill, to the Department of War and Navy, for use as an airport. It is approximately 900 yards long, by 350 yards wide, and perfectly flat. The location is readily accessible from the city by street cars to within walking distance, or by automobiles using the Roosevelt Highway which was recently put into first class condition.

Commercial Aeronautics in Sweden

Commercial aeronautics in Sweden is carried on by A/B Aerotransport, a corporation which enjoys government subvention. This company finances and operates two regular flying routes, Stockholm-Helsingfors and Melmo-Amsterdam. In addition it assists the German concern, Luft-Hansa, in operating the latter's line from Stockholm to Berlin via Kalmar and Stettin.

This route is operated between May 1 and Sept. 30, with one plane daily in each direction. Large three-engine planes of Swedish manufacture, seating 9 passengers, are in use.

The trips have been made very regularly and 219 of the 228 that had been scheduled for the time up to Sept. 10, have been performed. The record of safety on the line since its commencement in 1924 is 100 per cent, no passengers having received injury, and no merchandise or mail having been damaged or lost. The number of passengers transported has shown a steady increase, being 376 in 1924, 426 in 1925, 829 in 1926, and 1,043 from May 1 to Sept. 10, 1927.

In its annual report to the Government, A/B Aerotransport points out the necessity of extending activities on this route, so that at least air transportation of mail be arranged during the winter, inasmuch as this route probably will become a stage of a future Leningrad-London line, which, it is presumed, will touch Helsingfors, Stockholm, and Goteborg.

Investigate New Zealand Air Base

From England to New Zealand in 12 days is the forecast of members of the special mission appointed by the British Air Ministry to investigate the possibilities of suitable airship bases in New Zealand. It is reported that model and full-scale research and experimental work in connection with the scheme has now been completed and it is anticipated that the home trials of two 5,000,000 cu. ft. airships will be finished early in 1928. The airships as proposed will carry 100 passengers each and will be equipped with heavy oil engines. They will follow the routes of the old sailing vessels, and South Africa, which has already ordered a mooring tower, should be an important link in the system. The total cost of the scheme, including all the airships and bases as well as mooring masts in England, Egypt, Africa, Australia, and New Zealand, would amount to approximately £4,500,000.

Side Slips

By ROBERT R. OSBORN

The newspapers recently carried a story about a mail pilot who became lost in a light fog, but who succeeded in making a successful landing on a farm near the airport. While rolling along the ground he ran over a railroad bank and fell down to the tracks. Although bruised and dazed he succeeded in getting the last pouch of mail out of the plane just as a train came along and smashed it to bits.

• • • •

At the time of this writing the flight of the Sikorsky amphibian owned by Mrs. Grayson seems to be abandoned for the winter season. Of course any opinions we may put forth as to the cause of the dissension during the unsuccessful flight attempts are from pure guess-work on our part, but we have a theory that the trouble may have arisen from an unfortunate error in the design of the plane. Mrs. Grayson complained that her suggestions were disregarded by the pilot during the flights. Her position was in the aft portion of the fuselage, and our theory is that the pilot automatically disregarded any suggestions coming from the back seat.

• • • •

Miss Elder is reported to have sent the following cable to Mrs. Grayson,—"Wish you the very best luck when you start. Beware of low pressure areas." From this it seems that the deadly low pressure area has taken the place of wooden nickels, red licker and oil stock which, in the past one was always warned to keep away from, when making a journey somewhere. As soon as we can spare the time we intend writing a tearful ballad, along the line of "Where is My Wandering Boy Tonight?", using the theme, "My Boy, Keep Clear of Them Low Pressure Areas, They Caused Your Father's Downfall."

• • • •

One of our "newly made" aviators received quite a bit of publicity the other day by asking the police to hunt for a flying suit which was stolen from him, the flying suit consisting, according to newspaper accounts, of riding boots, whipcord breeches, leather coat and other miscellaneous items. If we were the detective assigned to such a case we'd look first among some of the case-hardened fliers who have been making a living out of aviation for ten years or so. Most of them seem to be able to fly quite well attired either in business suits or jumpers, and we have heard some of them say what they would do if they ever got their hands on some of the flossier flying outfits of the younger generation.

• • • •

With so much aviation news in the papers lately we think the headline writers should be careful to distinguish aviation items from the more usual news. For instance, we had to read most of the articles with the following headings before we found they were nothing for us to get excited about,—

"Tenants In Flight As Still Explodes"
"Ship Sent To Bar Pangalos Flight"
"Navy's Air Attack Downs Penn."
"Convict Injured In Joliet Flight"

• • • •

The Intrepid Aviator was in the office again today and not only refused to speak to us, but "high-hatted" everybody else in the place. It took us quite a time to find out the cause of the celebration, which was that he had just read about the socially prominent young man who had joined the air service so that he could "die like a gentleman."

SERVICE

This is what Edo floats are built for. Ability to get off water quickly with full load. Staunch construction proved by 32 pairs of floats sold during last year. But above all, Edo floats have the shape and arrangement which allow comfortable embarking and disembarking of passengers. However excellent the performance of the floats may be, they are useless to operator, unless they offer sufficient comfort for passengers getting in and out.

Single float installations and floats with round tops were produced in war time for seaplanes which nobody but expert sailors handled. The comfort of passengers did not have to be considered.

The Executive staff of the Edo Aircraft Corporation have had enough experience in commercial seaplane business to realize the difference between war time and commercial requirements. Edo twin float installation with flat decked floats of novel shape, and with steps on struts afford maximum convenience in getting in and out of the machine.

EDO AIRCRAFT CORPORATION — College Point — L. I., N. Y.

AIRPORTS AND AIRWAYS

Seattle, Wash.

By R. P. Knowlton

John R. Allen, promotion manager of the Bell Buss Company Inc., announced in Portland that a scheduled air service between the city of Portland and Seattle, Portland and San Francisco via Medford, Ore., Portland and Seaside, Government Camp and Hood River and Portland and Spokane will go into effect in the spring. All passengers and freight will be transported in the most modern enclosed planes now available. This will effect all the lines mentioned.

The Bell Buss Company is the second company of stage operators to announce recently the projected establishment of the west coast air service headquarters in Portland. The West Coast Air Transport Company was established by the heads of the Pickwick Stage Company.

Five seven passenger planes, which are of the new cabin type, are now in the course of construction by the Alexander Eaglerock Co. for the passenger and freight service out of Portland by the Bell Buss Line, it is stated.

Six other Eaglerock planes, of three passenger capacity are now in operation, four in Portland, one in Oakland, and one in San Francisco. This fleet will be supplemented by the fleet of larger machines to go into service.

The present plan of the company is for two round trips daily between Seattle and Portland, and Medford and Portland. Medford will serve as the division point. Four planes will be stationed there to handle the traffic of San Francisco, the Bay cities and Los Angeles. One round trip daily will be made between Portland and Spokane, after the west side service has been established.

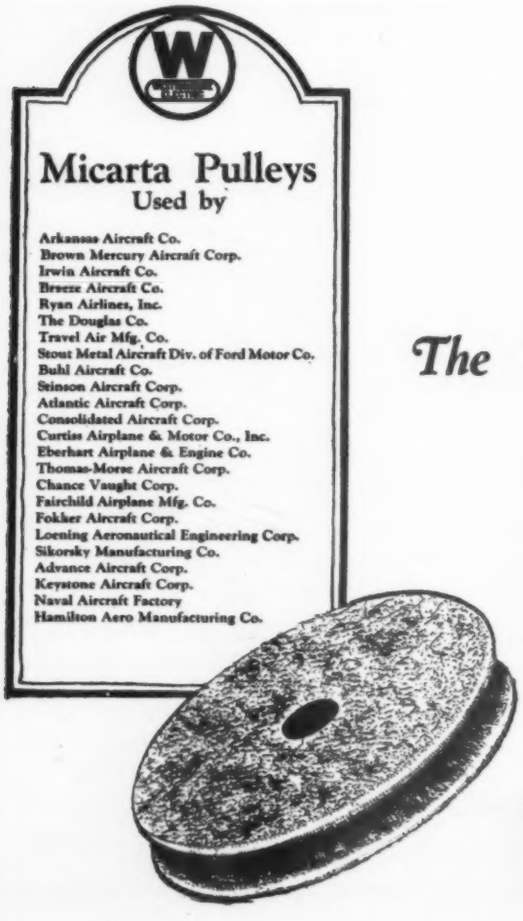
To provide the pilots for this service the Bell Buss line has established a Flying School at Vancouver, Wash., where thirty students are now registered. Other schools will be established in other cities of the Northwest and California, including Seattle, Tacoma, Medford, Oakland and San Francisco.

Spokane, Wash.

By E. Harve Partridge

Incorporation of the Mamer Flying Service, Inc., has been completed. Clarence Paulsen, son of the late August Paulsen, millionaire mining man and realty owner of Spokane, is president and pilot Nick B. Mamer vice president and general manager. Lieut. W. W. Williams, National Guard flier, has been added to the company's personnel.

The company uses the National Guard flying field where the national air races were held. For flying equipment it has a Buhl Airsedan and Buhl Airster, both powered with Wright Whirlwind engines, an OX-5 Swallow for student



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LINDBERGH'S, Chamberlin's, Byrd's, and Maitland's planes, all built by different makers, have one thing in common—Micarta pulleys manufactured by Westinghouse.

Lighter by half than aluminum pulleys; self-lubricating, they prevent practically all wear on control cables. They are tested and approved by the U. S. Army and Navy Air Services. Standard designs and sizes in stock.

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training and a Hisso Standard utilized by students to get in the required solo time needed for license. The Airster is the machine in which pilot Mamer won third place in the Class A National Air Derby from New York to Spokane.

Prince William of Sweden has been taken for an aerial tour over the Columbia Basin reclamation project in Washington, flying in pilot Mamer's Airsedan. The Columbia Irrigation League sponsored the trip in the interest of the project.

Four Spokanites flew in the Buhl cabin job across the Cascade mountains recently to Seattle to attend the University of Washington-Washington State College football game. To make the trip an altitude of 10,000 ft. is required. Pilot Mamer reported the trip made without special incident.

The largest aerial mapping contract ever made in the Inland Empire has been completed by pilot Mamer and Lieutenant Williams for the Consolidated Mining and Smelting Company of Trail, B. C.

For many years there has been controversy as to the extent of damage to American farmers from fumes from the smelter in British Columbia and it has caused some international litigation between state departments.

The survey, covering an area of 141 sq. mi. in northern Washington and in British Columbia, is expected to be a big aid in settling for all time the fumes controversy as it will show the extent of damage to vegetation in the district.

Pittsburgh, Pa.

By Ray A. Tucker

A long delayed movement to obtain for Pittsburgh an adequate airport to enable competition with other cities in aviation progress and attract aeronautical industries has been launched by the Chamber of Commerce. This was brought about by Truman P. Gaylord, president of the chamber, and vice-president of the Westinghouse Electric & Mfg. Company, by appointing a committee to make a survey of Allegheny County, select the proper site for the proposed airport, and enlist support in its purchase and development. This committee is composed of:

Arthur E. Braun, president of the Farmers Deposit National Bank, chairman; A. L. Humphrey, president of the Westinghouse Air Brake Company; William L. Monro, president of the American Window Glass Company; John F. Casey, contractor; H. N. McClintic, vice president of the McClintic-Marshall Construction Company; James Francis Burke, general counsel of the Chamber of Commerce, and Morris Knowels, consulting engineer and chairman of the city planning commission.

This action became necessary due to the filing of a report by a special committee which made a preliminary survey of the aviation situation here.

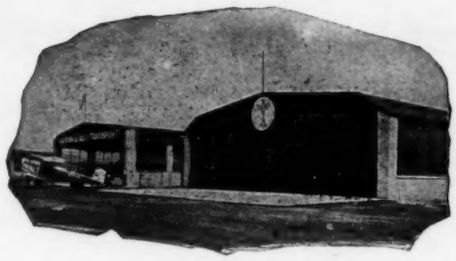
This report suggested that Rodgers Field, the municipal airport of 42 acres, be abandoned because it cannot be developed sufficiently and is remote and inaccessible from the city.

It was further suggested that a new committee of from five to ten members be appointed to make a complete survey, and enlist the support of the Aero Club of Pittsburgh, and other individuals and organizations to urge the purchase and development of an adequate airport. Furthermore, that the committee be instructed to employ experts on airport engineering to come to Pittsburgh and make a survey. This committee is to start functioning immediately.

The Aero Club of Pittsburgh was host recently to over 600 guests from nine luncheon clubs, at the Fort Pitt Hotel, whose presidents make up the Presidents' Round Table. It was Aviation Day, with Robert E. Dake, newly elected president of the Aero Club presiding.

The speakers and honored guests were Carl F. Egge, formerly superintendent of U. S. Air Mail, and Art Goebel, winner of the Dole Prize.

Mr. Egge's subject was "Commercial Aviation Possibilities",



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College Point, Long Island, New York.

An EAGLEROCK advertisement as might be written by the man who has never seen one.

This opportunity to tell you about the Eaglerock fills me with joy. There are a couple hundred Alexander ships floating around the U. S. but my job as subway guard makes me a sun-dodger and I lose out on what's above ground.

I've had to content myself with the door crank as a joystick but with a picture of the Eaglerock which I tore from the Alexander house organ, the "Aircrafter" (you'd ought to be on the mailing list) in the other hand and the fourth lesson from Clevenger's instruction book, "Modern Flight" (they sell those for a dollar) tucked away in my mind, I do my daily dozen.

Say boy, that's some plane. As I bank for a turn at 42nd street I can hear the hum of the wires and thank my stars I am in a "certified" ship. Hamilton prop, cockpit covers, tie-down ropes, OX5 tools, fire extinguisher, first aid kit, Miller valve action, gas filter, rigging chart, stream line wires and auto hood cowling, all standard equipment.

And they tell me, if performance with economy means anything, they're there in that blue and silver baby.

The low price of $2475, Denver field, and the offer to sell on time payments seems to be the result of mass production, whatever that is.

I'm sure you can't go wrong if you buy one! I'd trade my job for an Eaglerock in a minute if I was going any further than the Bronx.

Shhh-h-h! McInaney had to turn his head to save his blushes.

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which he handled in a most convincing manner.

Art Goebel received a splendid reception from the audience when he finished relating some high points in his Hawaiian flight.

Goebel and his party landed at Rodgers Field the day before, in the "Woolaroc" and were met by a large reception committee made up of representatives of the Aero Club and Chamber of Commerce.

Merle Moltrup, air mail pilot on the Pittsburgh-Cleveland route, and friend of Goebel's, flew over from Bettis Field to greet him.

The Waverly Oil Company of this city headed by Thomas J. Hilliard, recently purchased a Waco-10, to be used by the company for rapid transportation of its officials. It is being kept at Bettis Field, McKeesport, and C. V. Pickup has been selected as pilot.

The Pittsburgh Chapter of the N.A.A. headed by E. W. Cleveland, its president, has opened a membership drive. The opening program of the campaign consisted of a showing of aviation pictures at the Cameo Theatre to all persons interested, and a special invitation to the members of the Aero Club of Pittsburgh.

Philadelphia, Pa.

By Ray Krimm

When Col. Charles A. Lindbergh visited Philadelphia his first official act was to formally dedicate the new Philadelphia Airport on Island Road near Tinicum Avenue, 25 minutes motoring distance from City Hall.

The airport, operated by the Ludington Philadelphia Flying Service, Charles Townsend Ludington, president, received two dedications within a week. Several days previous to the Lindbergh visit, 30,000 Philadelphians assembled at the flying field to watch city officials and officers of the Greater Eastwick Improvement Association stage a flag-raising ceremony.

The flag and flag-pole were donated to the airport by the Eastwick Association, under whose auspices the celebration was held.

The flag was raised by Mrs. W. Freeland Kendrick, wife of Philadelphia's mayor.

The Philadelphia Airport is expected to be materially enlarged next year. The port covers 111 acres at the present time and an additional 90 acres are available adjoining it. The field now is in the shape of a rough diamond and lies in the direction of the prevailing winds. Its longest length is 1,800 ft.

Two large hangars of the 103rd Observation Squadron, P.N.G., and the two Ludington hangars, comprise the port's equipment. In one of the Ludington hangars are stored nine planes owned by Philadelphians who use them for sport and business trips.

The Ludington Company has a ten-year lease on the airport, effective from June 1, this year. Near its two hangars a clubhouse has been erected for the convenience of visiting pilots.

At an organization meeting held at Berwick, Pa., J. Sanford Saltus, Jr., of Philadelphia, was elected president of the Pennsylvania Aeronautical Association.

The meeting, held under auspices of the Berwick Aeronautical Association, was attended by several dozen pilots representing cities and towns throughout the state. The Berwick and Lancaster Aeronautical Associations joined the association immediately and plans were laid to enlist the aid of various other flying associations throughout Pennsylvania.

Mr. Saltus was instructed to appoint a committee to outline plans for completing the organization, the purpose of which will be to compile all possible data for the use of fliers in the state.

Among the pilots at the meeting were Jack Ashcraft and

Buck Steel, of Towanda; J. P. Jones, of Lancaster; Lloyd Yost, of Conygham; Henry Noll, of Pleasant Gap; J. M. Cooper and C. W. Hunter, of Millersburg; R. D. Whipple of Chicago; G. A. Newman, of Moscow; Robert P. Hewitt and Mr. Saltus, of Philadelphia; officials of the Reading Chamber of Commerce; Fred Nelson, of Middletown; William Veal, of Hazleton; Hyman Winterstein, of Berwick, and George Rutledge, of West Pittston.

Captain Hugh L. Willoughby, 71 years old, was one of the Philadelphia Airport visitors recently. Known to the aviation industry as the man who claims to be the world's oldest pilot, Captain Willoughby flew to Philadelphia and purchased an Orenco plane. He expects to convert it into a seaplane.

The captain is dividing his time, these days, between Newport and Florida.

"Al" Graham, one of the best known of Philadelphia's home-town barnstormers, arrived at the Philadelphia Airport with a new American Eagle plane which he flew from Kansas City.

The Ludington Philadelphia Flying Service, Philadelphia Airport lessee, has completed the installation of 36 field boundary lights around the 111 acres at the airport. The lights, placed at intervals of about fifty feet, are red, white and green, the red lights denoting dangerous landing spots and obstacles, the green lights denoting the most favorable landing places, and the white lights indicating the fair landing spots.

Completion of the boundary light installation brings the airport's $[illegible],000 lighting program to a successful end, at least for the present. The equipment includes a 500-million candlepower field floodlight, a flashing beacon on top of one of the large hangars that flashes the letter "P" in the Continental code every night, floodlights on top of the second hangar, an illuminated "sock" and various other lights at and near the two hangars.

Governor Robinson, of Delaware, will place before the state legislature at its next session a plan for the fortification of the quarantine station near Lewes, Del., and its transformation into an aviation outpost to guard the mid-section of the Atlantic coast line.

If the plan is adopted, Philadelphia, Washington, Baltimore, Wilmington and their neighboring towns would be protected against possible air attacks launched from foreign vessels in time of war.

If it is established, the outpost would defend the Philadelphia Navy Yard, the Washington, D. C., Navy Yard, the munition plants at Baldwins, Midvale, Bethlehem and Sparrows Point, the powder and high explosive plants of the du Ponts, the chemical warfare plants in Baltimore and other factories producing war material.

Pitcairn Aviation, Inc., has announced the delivery of two more Pitcairn Fleetwing DeLuxe planes, three-place with OX-5 engines. One was sold to Eugene Tarangul, of Bound Brook, and the second went to a resident of Reading, Pa.

F. Trubee Davison, Assistant Secretary of War for Aviation, stopped off at Pitcairn Field, Hallowell, Pa., near Philadelphia, and left his plane at the field overnight while he visited in Philadelphia. He was bound north on a business trip and was flying a Douglas O-2.

Alexis Felix du Pont, Jr., son of the vice-president of the E. I. du Pont de Nemours Company, of Wilmington, has enlisted in the United States Army as a cadet flier.

Mr. Du Pont left immediately after his enlistment for Brooks Field, near San Antonio, Tex., where 1,300 other cadet fliers are taking the Army course. He took his preliminary tests at Boston, three months prior to his enlistment and received a passing mark.

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SPECIFICATIONS

Weight empty	2100 lbs.
Wing Span	42 feet
Wing Area	320 sq. ft.
Length	28 feet
Pay Load	1000 lbs.
Seating Capacity	Pilot and 4 Passengers

PERFORMANCE

High Speed (sea level)	120 M.P.H.
Landing Speed	45 "
Cruising Speed	100 "
Service Ceiling	14000 feet

POWER PLANT

Wright Whirlwind	J-5
Horsepower	200 at 1800 R.P.M.
Fuel Capacity	70 gals.
Oil Capacity	4 gals.

EQUIPMENT

Self Starter, Brakes, Metal Propeller, Compass, Air Speed Indicator, Navigation Lights, Tachometer, Altimeter, Clock, Fire Extinguisher, Fuel, Oil Pressure and Oil Temperature Gauges, Air Corps Throttles, Strainer and Fuel Valve, Ring type exhaust manifold with muffler and cabin heater.

The Airsedan is not equipped with adjustable stabilizer. Exceptional stability and balance under varying loads make this feature unnecessary.

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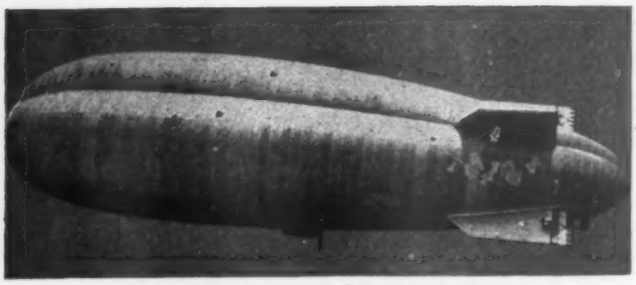

Giant U. S. Airship RS-1 Is Equipped With Belden Wire

THE dirigible RS-1, which recently successfully completed its second trip, from St. Louis to Langley Field and return, is equipped with Belden Shielded Wire for all low tension service.

When the successful record of Belden Shielded Wire and Cable in outstanding airplane achievements is considered, it is not surprising that so many aircraft engineers prefer it.

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Reading, Pa.

In the presence of 10,000 Pennsylvanians, Whander Field, the commercial airport of Reading, Pa., was dedicated by thirty Army, Navy and commercial planes.

The field, named by taking the first letter of the surname of each member of the Aviation and Airport Committee of the Reading Chamber of Commerce and combining them, is operated by the Reading Airways, backed by Allen K. Owens. Owens was a member of the British Royal Flying Corps during the war.

Lieut. Roy R. Darron, from the Fifth Fighting Squadron, United States Navy, stationed at Hampton Roads, Va., had the distinction of landing the first government plane on the field. As he landed he was greeted by Arthur Arrowsmith, of the Chamber of Commerce committee.

The field was formally dedicated by Mrs. Allen K. Owens, wife of the airport director, who raised an American flag after a speech by John P. Wolfinger, chairman of the Chamber of Commerce committee. A Reading Airways plane arrived at the field early in the afternoon with letters to Mayor William E. Sharman and other prominent citizens, mailed from western cities and picked up at Philadelphia. The program ended with stunt flying and parachute jumps.

Whander Field is about five miles from Reading's city limits, north of the city on the Pottsville Pike. A state highway affords easy access by automobile. The field, a cornpatch a few months ago, was graded and a 60 by 60 ft. hangar erected, gasoline and oil pumps installed, and a complete workshop placed in operation. The hangar is of steel, and of the demountable type.

Reading Airways will inaugurate long-distance taxi and freight service on the new field, which covers fifty acres. It can be used for seaplane landings, the new municipal reservoir covering so much of the valley that planes equipped with pontoons can use it for an inland landing station on their way from the coast to the Great Lakes.

Until this year, a large level field at Shillington, owned by the Berks County almshouse, was Reading's only landing field. Although within a mile from the city line, it was rejected as an airport because of the high value of the land.

Among the Chambers of Commerce represented were those of Allentown, Harrisburg, Lebanon, Bethlehem, Easton, Pottstown, Boyerstown, Lancaster, York, Temple, Shillington, West Reading, Sinking Spring, Kutztown, Hamburg, Pottsville, Berwick and Hazleton.

Milwaukee, Wis.

By H. C. Brunner

The first day of official business at the city's new airport, Maitland Field, brought five airplanes to the field, one of which stayed overnight. This represented the first formal report of F. R. Moore, the newly appointed attendant at the field.

One of the five planes, he informed the harbor commission, carried mail, one was a passenger plane, one pleasure, and two were in service for commercial purposes. The field will be in service only during the day until lighting facilities are provided. A building is now under construction that will serve as a transformer room, comfort station and office, and it is expected that it will be ready sometime this month.

The Milwaukee county park commission has approved the plans for the construction of a permanent runway at the Cudahy Airport, and construction will begin at once. The runway will be 6,000 ft. by 100 ft. and will cost $7,400.

Otto H. Bernhard of the Focke-Wulf Co., of Germany, builder of the Focke-Wulf "Ente" was a recent Milwaukee visitor.

The Milwaukee Association of Commerce is working diligently to make of Milwaukee an "air-minded" city. For

this purpose they have drawn up four committees to take the following steps: To prepare an advertising program for the purpose of selling aviation and air mail to the public; to take direct action toward promoting greater use of the air mail; to urge painting on building roofs the name of the city with a large arrow indicating the direction of the airport, and to seek to have a government flying school located in Milwaukee.

According to E. N. Quinn, president of the Royal Airways Corp., regular airplane passenger service on the Madison-Milwaukee-Chicago line will begin in a short time. Busses from Minneapolis, to Madison; Davenport, to Chicago, and Chicago to Milwaukee will cooperate with the air line.

The East Side Auto Sales Co., of which Manfred Warshauer is president, has amended its articles of incorporation to include airplanes and all other machinery in lines which it is authorized to handle. Another Milwaukee concern which has included the manufacture and sale of airplanes in its articles of corporation is Geo. H. Williams, Inc. Members of the corporation are Geo. H. Williams, Carl B. Rix, and Meta Curschmann.

Racine, Wis.

To accommodate flying salesmen, Dr. George Ross, founder of Air City, Racine's airport, is building an air depot similar to waiting rooms in railroad stations. This new depot is the first in Wisconsin and the second in the United States, Henry Ford having built the first one in the country at Detroit.

The new depot at Air City will have display and sample rooms where flying salesmen who visit Racine may show their goods to merchants and other customers. The sample rooms will be adjacent to the pilot's clubrooms, now being built into the reconstructed airdrome at the airport. Conference rooms for business men who fly to Air City will also be provided in the big clubhouse.

Oshkosh, Wis.

A first class airport has been established at Oshkosh. The field at present is slightly over 100 acres, within two miles of the post office and consists of good, high, well-drained land, the entire field being of alfalfa and clover sod. It is practically perfect and was proved so when a five-passenger Lincoln landed and took off during a rain storm of five days duration. The field is marked with the customary 100-ft. white circle in the center and there are no obstructions on any side that would hinder flying in any way.

A hangar, 80 x 96 ft., of concrete and steel, is now being constructed and will soon be completed. There will be an office, workshop and sleeping quarters for two men, who will be in constant attendance.

Planes are cordially invited to land and stay as long as they like. Nothing will be spared to make the visit a pleasure.

Oshkosh papers are carrying advertisement to the effect that the Oshkosh School of Aviation will open soon. A. Robert Mensing, Jr., a government licensed pilot, with eight years of flying experience, is chief instructor at the school. Chief mechanic at the school is Harvey H. Mahrt who has had three years experience in the U. S. Air Service, while F. Belongia is assistant mechanic.

The school is using the Oshkosh Airport as its field, and prospective students are advised that they can complete the ground course of training in ten weeks with two evenings a week of instruction. Actual flying instructions will be given in half hour periods to be arranged by the students.

Superior, Wis.

The Arrowhead Airways, Inc., is trying to raise money for improving its landing field here, by selling emblems which are

CURTISS ENGINEERING

The development of modern aircraft is a highly specialized science, requiring in the proper co-ordination of its phases the finest of scientific equipment and the highest types of engineering skill.

In these respects, the resources of the Curtiss Company are unequalled. The Curtiss wind tunnel, for instance, is the only one in the United States that is owned and operated by an aircraft manufacturer, and recent additions to its equipment have made it one of the most modern in the world. In this tunnel, the performance and flying characteristics of all Curtiss aircraft, are definitely determined by trained engineers, in advance of the actual construction of the full-size aircraft.

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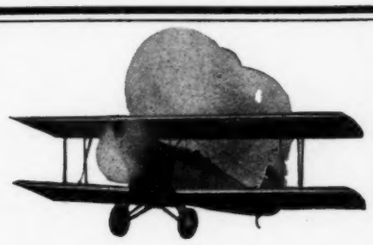

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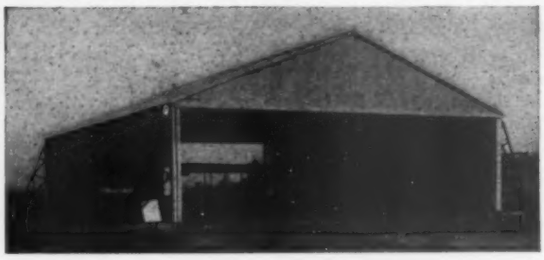

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replicas of the Spirit of St. Louis. Prizes will be awarded the persons selling the largest number of emblems and all money will be banked by the public affairs committee.

The prizes which the company is offering consist of a full course in plane piloting and a full aviatrix suit, a part course in piloting and a choice of either a leather coat or a suit and goggles.

Wausau, Wis.

Construction on the new Alexander Airport, Wausau, goes forward at a rapid rate. The contract has been let for a new steel and concrete seven-place fireproof hangar, which will be finished within one month.

Recently Bob Gast with Mr. Ellison and Stewart Auer of Milwaukee dropped in on the airport with his new Laird Whirlwind job. Mr. Gast was very enthusiastic about the excellent condition of the airport, and visiting planes are invited to drop in at any time.

Oakland, Cal.

The control, construction and operation of the Oakland Municipal Airport is under the jurisdiction of the Board of Port Commissioners of the Port of Oakland. It is the intention of the board to entirely level the area of 825 acres, for which purpose it will use the new dredge to make necessary fill to grade. The board has let contracts and has under construction an administration building, 60 x 42 ft. and two steel hangars, each 90 x 200 ft., with machine shop space for each hangar, 20 x 64 ft.

In addition, the board has let contracts for the drainage of the improved field and runway and a roadway in the rear of the administration building and hangars to connect with the main roads or streets leading into the center of the city. Plans and specifications are being prepared for the lighting of the airport.

Steubenville, Ohio

By Charles A. Rector

Steuben Field, operated by the Steubenville Aero Club, of which J. S. Moore is president, is located ten miles south of this city, at U. S. dam No. 11, on the Ohio River. At present the club has a Waco-10 operating and is doing a passenger-carrying business. A plane for training purposes has been ordered.

Chas. A. Rector is chief pilot at the field. Recently Mr. Moore made a cross-country flight to Cincinnati, where he acquired the agency for the Travel Air plane. In a flight from Norton Field, Columbus, to Steuben Field, recently, a distance of 150 mi., pilot Rector covered the trip in 1 hr. 30 min.

Cincinnati, Ohio

By C. E. Planck

The first air story, with an all-airman cast to be put on the air, was given over station WLW at Cincinnati Nov. 7 at 7:50 P.M. Eastern Standard time. There were 7 nightly episodes at the same hour and three more will be given.

It was the story-drama "Martha's Message to Garcia", presented by members of the Embry-Riddle Company, commercial operators at Lunken Airport, assisted by students of the Embry-Riddle flying school.

The play was written especially for its use over the radio by Mrs. Susan Embry, mother of T. Higbee Embry, president of the company, who was the only woman to fly as a passenger in the National Air Tour of 1926. Because of the necessity of presenting a connected narrative, part of the

play was read by the producer, who lead up in each episode to the dialogue which developed the action.

Ten episodes of about 10 minutes each were required to tell the story of the adventures of Martha Croninger, a student of the school, and Warren Vine, instructor and a pilot of the company, in carrying out a dangerous mission entrusted to Martha by a mysterious customer of the company.

The cast included T. Higbee Embry, John Paul Riddle, general manager of the company; Raymond D. Harris, head of the school; Miss Croninger; Samuel Wilds; C. O. McGuire; Frank Shoemaker, and Charles E. Planck.

Cincinnati newspaperwomen, facing the possibility of wasting a whole day getting to the sessions of the Ohio Newspaper Women's convention at Toledo, Nov. 4, decided to work up to the last minute and then fly to the convention in 90 minutes.

They flew with John Paul Riddle, general manager of the Embry-Riddle Company, in the Ryan plane belonging to the company. Instead of fretting hours away on a train, the scribes, one of whom is the state president, was at Toledo less than two hours after leaving Cincinnati.

Mrs. Mary Bradstreet, president of the state association, Miss George Ellison, society editor of the *Times Star* and a poet of considerable renown, Miss Anne Cutler of the *Enquirer* and Mrs. Ruth Neely France of the *Post* comprised the party.

Youngstown, Ohio

By Jack I. Burson

Youngstown Aero Club was recently organized and from the way people interested in this industry from a business and pleasure standpoint are joining, the maximum membership of 150 will be filled by the first of the year. This progressive club intends to educate its members in the machanism of airplanes before they actually take up air training thereby making it safer for the student as well as the public. Instructions are to be given by a competent instructor and the necessary equipment will be purchased. The plans are to have an airport and club house. Any one interested can get in touch with the organization at Andrews Field, or the secretary, Jack I. Burson.

Hartford, Conn.

By B. A. Pollet

Governor John H. Trumbull successfully completed his first solo flight, required by the Department of Commerce, to make him eligible for a pilot's license.

He has for some time rightfully been designated as the "Flying Governor", and he has personally been largely instrumental in creating a friendly attitude among the local legislators towards activities appertaining to aviation. Not only has he repeatedly asserted his full confidence in flying by word of mouth only, but he has never hesitated to utilize this mode of transportation whenever available for his purpose.

Officers and men of the 43rd Air Squadron, Connecticut National Guard, are waiting with pardonable impatience the arrival of a Curtiss Falcon pursuit plane, powered with a Pratt & Whitney 425 hp. Wasp. The engine is a gift to the Army by Pratt & Whitney Aircraft Co., with the understanding that the plane, when completed would be assigned to the 43rd Air Squadron. The assignment will probably not be made until spring, however, as it will be necessary to flight test the plane before delivery.

Much publicity is given in New England to the necessity of marking the name of the town on the roofs of prominent buildings for the guidance of passing planes, and the Chambers of Commerce are urged to make it an issue in their

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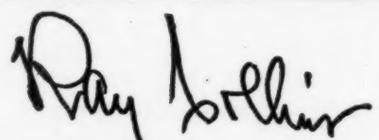

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activities. As ever in the foreground in such matters, Gov. Trumbull has had his factory at Plainville plainly marked, and numerous plants are now following his example.

Master Serg. Chas. F. Cain, of the 43rd Air Squadron, is in a fair way to becoming an aeronautic pedagog, with classes in aviation going strong in four different towns in Connecticut. Classes are held once a week in Hartford, New Haven,

Reading left to right: Major Ladd, commanding officer 43rd Air Squadron; Major Perkins, U.S.A.; Captain Biddlecomb, R.A.F.; Governor John F. Trumbull; and Hiram Percy Maxim. They are standing before one of the Colonial Air Transport, Fokker tri-engine planes.

Waterbury and New Britain in each case under the auspices of the various American Legion posts. The classes average thirty in number and a definite schedule is being adhered to. The subjects are taken in a regular sequence and are approximately as follows: terminology or nomenclature; simple internal combustion engine; ignition; carburetion; air cooled engines; water cooled engines; rotary engines; radial engines; mounting; plane structure; rigging; wings; air foils; propellers; aerodynamic laws. Of course no attempt is made to go very deeply into any of the subjects, the lack of time making this impossible, but it is hoped to so intrigue the student in each subject, that he will of his volition continue from the simple ground work completed at the class and study during his own time.

A unique opportunity was given to Hartford to observe the behavior of the new Loening OL-8 Amphibian plane equipped with the Pratt & Whitney 425 hp. Wasp engine, which arrived at Brainard Field recently. The repeated visits of planes adapted to water landings is stressing the necessity of an adequate runway from the river side of Brainard Field. Such a runway and adjoining hangar is contemplated for the near future as it is expected that with the allocating of the Navy contract to the Pratt & Whitney Aircraft Co., many more planes of this type will make this the port of call.

Huron, S. D.

During the third stop-over of the Stanolind at Huron, a party of officials on board were on their way to attend the opening of the new beet sugar factory at Bellefourche, S. D.

Shortly after landing the large transport plane, a tire blew out due to a stone bruise. A new tire was received from Detroit on the evening of the following day, allowing the Stanolind to resume its trip.

UNITED STATES AIR FORCES

New Schedules for Air Corps Schools

In conformity with the readjustment of the schedule for periods of classes at the Air Corps flying schools, students are now en route to the primary schools located at March Field, Riverside, Calif., and Brooks Field, San Antonio, Tex. The student body for March Field, which is being reopened with this class after several years of inactivity since the war, will be made up of approximately 100 flying cadets, whereas the class at Brooks Field will be made up of approximately 50 flying students comprised of officers from other branches and those officers recently graduated from the United States Military Academy at West Point.

The classes will undergo flying training at the primary schools for a period of eight months, during which time they are given training on the primary type of aircraft, the PT-1, for approximately four months, and are then advanced to a service type of plane, the steel fuselage De Havilland design, known as the DH-4 with Liberty engine. Upon successful completion of eight months of intensive training in the piloting of airplanes, the students will be sent to the Air Corps Advanced Flying School at Kelly Field, San Antonio, Tex., where for four months they will be trained in the military application of the airplane. This class is divided in order to permit specialization in the advanced phases of aviation, namely: pursuit, attack, observation and bombardment. Students successfully completing the advanced course will be rated airplane pilots and those students of flying cadet status will be tendered reserve commissions in the Army Air Corps.

Air Corps Demonstrations Planned

A series of demonstrations, which will involve simulated and actual attacks on ground targets and troops with a view to the further development of aerial offensive tactics and ground defensive measures to combat them, will be given next spring by Air Corps units at the various service schools. Dates will be announced later. Pursuit and observation type planes will predominate. Approximately 75 planes will participate in the demonstrations, which will take place at the Field Artillery School at Fort Sill, Okla.; the Cavalry School at Fort Riley, Kan.; the General Service Schools at Fort Leavenworth, Kan.; the Infantry School at Fort Benning, Ga.; the Field Artillery Firing Center, Camp Bragg, N. C.; and the Air Corps Tactical School at Langley Field, Va.

Army Air Orders

The following officers, Air Corps Res., are ordered to active duty, from cities indicated, to Wright Field, reverting to inactive status Oct. 29: Lieut. Cols. Andrew Bart Berger, Pittsburgh, William Frew Long, Cleveland, Capt. Walter Morrison Moore, Osborn, Ohio, and Sec. Lieut. Stanley Clarence Huffman, Mariemont, Ohio.

Capt. Rudolf Leonard Gaalaas, Air Corps Res., Stillwater, to Chanute Field, reverting to inactive status Oct. 15.

First Lieut. Silas C. Hyndshaw, Air Corps retired from active service.

First Lieut. Earle Roberts Strong, Air Corps Res., Washington, D. C., to active duty New York City, reverting to inactive stauts Oct. 15.

The following officers of the Air Corps are relieved from assignment and duty, from places specified, and will proceed to March Field, reporting to commanding officer for duty: Capt. Thomas Boland, First Lieuts. Harry F. Colliver, Arthur G. Liggett, Warren A. Maxwell, Walter Miller, Leo F. Post, Harvey W. Prosser, George E. Rice, and James G. Taylor, Kelly Field; First Lieuts. Kenneth Garrett, Ray L. Owens, Sec. Lieuts. Charles A. Bassett, James H. Collins, Clinton W. Davies, Charles W. Lawrence and David M. Schlatter, Brooks Field.

First Lieut. Jesse Joseph Owen, Air Corps Res., Washington, to active duty Scott Field, reverting to inactive status Oct. 15.

Navy Air Orders

Lieut. William J. Slattery det. VT Squad. 2B Aircf. Squad., Battle Fleet, to VT Squad. 9S, Aircf. Squad., Sctg. Fleet.

Lieut. (jg) James F. McDonough det. VT Squad. 2B, Aircf. Squad., Battle Fleet, to VT Squad. 9S, Aircf. Squad., Sctg. Fleet.

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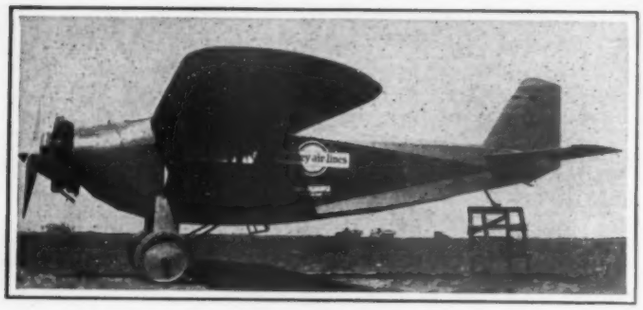

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Index to Advertisers

Advance Aircraft Co. 1154
Aero Supply Co. 1201
Aerotech, Inc. 1216
Aircraft Service Directory 1214-1215-1216
Air Transport Equipment 1216
Alexander Aircraft Co. 1202
American Eagle Aircraft Corp. 1205
American School of Aviation 1204
American Trading Co. 1216
Arch Roof Construction Co. 1218
Austin Co. 1201
Aviation Institute of U. S. A. 1153
Bass-Heuter Paint Co. 1183
Beck Distributing Co. 1214
Belden Manufacturing Co. 1204
Boeing Airplane Co. 1152
Buhl Aircraft Co. 1203
Campbell, Inc., Andrew C. 1191
Classified Advertising 1217-1218
Consolidated Instrument Co. 1182
Crawford Airplane Corp. 1215
Curtiss Aeroplane & Motor Co. 1205
Eclipse Machine Co. 1220
Edo Aircraft Co. 1199
Elgin National Watch Co. 1190
Embry-Riddle Co. 1215
Esline Company 1206
Fairchild Aviation Corp. and Subsidiaries 1151
Frampton, A. R. 1216
Gates Flying Circus 1215
Good and Foster 1187
Gordon & Ferguson, Inc. 1207
Gray's Flying School & Aero Service 1186
Gruss Air Spring Co. 1192
Guggenheim School of Aeronautics, Daniel 1215
Hall Aluminum Aircraft Corp. 1209
Hamilton Aero Mfg. Co. 1191
Hartzell Walnut Propeller Co. 1214
Haskelite Mfg. Corp. 1181
Ideal Clamp Mfg. Co. 1192
Ihling Bros. Everard Co. 1218
Ireland, G. S. 1216
Johnson Motor Products Co. 1214
Knapp Flying Service 1186
Kreider-Reisner Aircraft Co., Inc. 1215
Lincoln Aircraft Co. 1207
Loening Aeronautical Engineering Corp. 1150
Ludington Flying Service, Inc. 1215
Luthy Co., F. A. 1216
Mahoney Aircraft Corp. 1184-1185
Mallette & Son, J. E. 1214
Marshall Flying School 1208
Martin Co., Ned 1214
Mayer Aircraft Corp. 1186
Meyrowitz, Inc., F. B. 1155
Mid-South Airways, Inc. 1214
Monumental Aircraft Co. 1216
Moto Meter Co., The 1193
National Aeronautic Association 1218
Nicholas-Beazley Airplane Co. 1189-1214
Northwest Ryan Aircraft Co. 1187
Ostergaard Aircraft Works 1216
Paragon Engineers, Inc. 1216
Perry-Austen Mfg. Co. 1210
Pheasant Aircraft Co. 1216
Phenix Aircraft Products Co. 1215
Pioneer Instrument Co. 1179-1214
Polachek, Z. H. 1216
Posey & Co., J. V. G. 1188
Pratt & Whitney Aircraft Co. 1158
Robertson Aircraft Corporation 1156
Ryan Aircraft Co.—Texas 1186
Sauzedde Corp. 1193
Scintilla Magneto Co. 1157
Service Steel Co. 1192-1214
Shaw & Co., B. Russell 1216
Southern Airways, Inc. 1215
Standard Steel Propeller Co. 1180
Strauss & Buegeleisen 1215
Summerill Tubing Co. 1188
Thurston, W. Harris 1190
Titanine, Inc. 1187
Travel Air Mfg. Co., Inc. 1208
Twining & Co., E. S. 1178
Valentine & Co. 1176
Van Schaack Bros. Chemical Works 1218
Varney Airlines 1210
Varney School of Flight 1214
Vimalert Co., Ltd. 1215
Von Hoffmann Aircraft Co. 1187
Wallace Aero Corp. 1214
Westinghouse Electric & Mfg. Co. 1200
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